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IEMP MID-YEAR DATA SUMMARY REPORT FOR 2003

FERNALD CLOSURE PROJECT
FERNALD, OHIO

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U.S. DEPARTMENT OF ENERGY

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LIST OF ACRONYMS

AMS	air monitoring station
amsl	above mean sea level
BTV	benchmark toxicity value
CFR	Cod of Federal Regulations
cfs	cubic feet per second
DOE	U.S. Department of Energy
EARP	Enhanced Anaerobic Reductive Precipitation
EPA	U.S. Environmental Protection Agency
FCP	Fernald Closure Project
FFCA	Federal Facilities Compliance Agreement
FRL	final remediation level
ft	feet
GMA	Great Miami Aquifer
gpm	gallons per minute
HRC	Haul Road Corridor
HRTEM	High Resolution Transmission Electron Microscopy
HTW	Horizontal Till Well
IEMP	Integrated Environmental Monitoring Plan
IRZ	In situ Reactive Zone
kg/d	kilograms per day
lbs	pounds
LCS	leachate collection system
LDS	leak detection system
Mgal	million gallons
mg/L	milligrams per liter
mrem	millirems
NESHAP	National Emissions Standards for Hazardous Air Pollutants
NPDES	National Pollutant Discharge Elimination System
OEPA	Ohio Environmental Protection Agency
OSDF	on-site disposal facility
pCi/L	picoCuries per liter
pCi/m^3	picoCuries per cubic meter
PF	Parshall Flume
PRRS	Paddys Run Road Site
RCS	Radon Control System
SIMS	Secondary Ion Mass Spectrometry
SWU	Southern Waste Units
TLD	thermoluminescent dosimeter
UCL	upper confidence level
µCi	microCuries
µg/L	micrograms per liter
$\mu g/m^3$	micrograms per cubic meter
WPC	Waste Pit Corridor
WPP	Waste Pits Project

1.0 INTRODUCTION

This Integrated Environmental Monitoring Plan (IEMP) Mid-Year Data Summary for 2003 provides the environmental monitoring results collected and monitoring activities performed from January 1 through June 30, 2003. This is the second mid-year data summary prepared in accordance with an agreement between the U.S. Department of Energy (DOE), the U.S. Environmental Protection Agency (EPA), and the Ohio Environmental Protection Agency (OEPA) (as identified in IEMP, Revision 3, requirements). As they become available, the IEMP data continue to be provided to the EPA and OEPA via the IEMP Data Information Site (i.e., the "Extranet Site"), at *http://iempdata.fernald.gov*.

As with the reporting approach in previous IEMP quarterly data summaries, the goal of the IEMP mid-year data summaries is to focus on notable events and results that are related to the data through a concise text discussion and presentation of data in graphical and tabular formats. Comprehensive full-year reporting, including all tables and graphs, will still be provided through the annual site environmental report. Table 1-1 identifies the IEMP data for each IEMP program under this report.

TABLE 1-1

DATA COVERED IN THE IEMP MID-YEAR SUMMARY AND/OR AVAILABLE ON THE IEMP DATA INFORMATION SITE

PROGRAMS	TIME PERIOD: Semi-annual 2003 — First Quarter 2003: JAN	FEB	MAR	Second Quarter 2003: APR	MAY	JUN
GROUNDWATER SAMPLING ACTIVITIES						
Extraction/Re-injection Operational Data	◆	◆	◆	◆	◆	◆
Total Uranium Only	|———	◆	——◆——	◆	——◆	
Private Well Monitoring	|———	◆	———	◆	———	|
Non-Uranium Monitoring[a]	◆———	◆	——◆——	◆	——◆——	◆
Groundwater Elevations	◆———		|	◆	———	|
OSDF SAMPLING ACTIVITIES						
LCS and LDS Volumes	◆	◆	◆	◆	◆	◆
Cells 1, 2, and 3 GMA Wells/HTW/LCS/LDS Analytical	|———	◆	———	|	——◆——	|
Cells 4 and 5 GMA Wells/HTW Analytical	◆	NA[b]	◆	NA[b]	◆	NA[b]
Cells 4 and 5 LCS/LDS Analytical	|———	◆	———	|	——◆——	|
Cell 6 GMA Wells/HTW Analytical	◆	◆	◆	◆	◆	◆
SURFACE WATER SAMPLING ACTIVITIES						
NPDES	◆	◆	◆	◆	◆	◆
FFCA	◆	◆	◆	◆	◆	◆
IEMP Characterization	◆		◆	◆	◆	◆
AIR SAMPLING ACTIVITIES						
Radiological Particulate (biweekly/monthly samples)	◆	◆	◆	◆	◆	◆
NESHAP Composite Analytical	|———		◆	|	———	◆
NESHAP Stack Analytical	|———		◆	|	———	◆
Environmental Radon	◆	◆	◆	◆	◆	◆
Silos Headspace Real Time Radon	◆	◆	◆	◆	◆	◆
Direct Radiation (TLD)	|———		◆	|	———	◆

◆ Data collected during this time period are covered in this mid-year summary. IEMP sampling that takes place during one scheduled event or round, quarterly or semi-annually, is identified with a marker (e.g., |———◆———|) where the symbol is present in the month or months the samples were collected.

[a] Includes South Field Extraction, Waste Storage Area, Property/Plume Boundary monitoring for FRL exceedances, and Property/Plume Boundary monitoring for PRRS constituents.

[b] NA = not applicable (this monitoring is bi-monthly).

2.0 GROUNDWATER MONITORING DATA

2.1 DATA COVERED

This IEMP mid-year data summary covers operational and analytical data that became available for posting to the IEMP Data Information Site from January 1, 2003 through June 30, 2003. Specifically, data are discussed below or provided on the IEMP Data Information Site, including:

- Operational data collected during the first half of 2003.
- Analytical data collected during the first half of 2003.
- Groundwater (Great Miami Aquifer) elevation data collected during the first half of 2003.

A review of aquifer restoration project activities during this reporting period was conducted to identify notable results and events (listed below). Tables 2-1 through 2-5 provide an operational summary of the groundwater extraction well performance for the reporting period, as well as a summary of all pumping efforts accomplished to date. Figure 2-1 is an extraction and injection well location map. Figures 2-2 through 2-4 provide updated uranium plume maps.

Data covered by this mid-year summary are available on the IEMP Data Information Site. Maps showing the locations of IEMP groundwater monitoring wells are also provided on the IEMP Data Information Site. All of these data sets are complete in accordance with sampling requirements identified in the IEMP, Revision 3 (DOE 2002).

2.2 NOTABLE RESULTS AND EVENTS

Notable results and events are those that impact, or could impact, the scope of IEMP monitoring or remediation operations at the Fernald Closure Project (FCP). Notable results and events associated with IEMP groundwater monitoring data for the time period covered by this mid-year summary include:

- Waste Storage Area – A uranium concentration of 35.2 micrograms per liter (µg/L) was measured in the Great Miami Aquifer in the vicinity of the Clearwell (Monitoring Well 2649). Higher-than-expected uranium concentrations were measured in filtered samples collected from two monitoring wells in the Pilot Plant Drainage Ditch Plume: CMT Monitoring Well 83124, Channel 1, had 1070 µg/L; and CMT Monitoring Well 83117, Channel 1, had 1160 µg/L.
- South Field Area - Installation of a replacement well for Extraction Well 31562 (EW-21). Installation of South Field Phase II Module extraction and re-injection wells. Increase in uranium concentration in Monitoring Wells 2397, 23275, and 2049.

- Off-Property South Plume Area - South Plume Optimization Phase II Geoprobing. Direct-push sampling conducted to update remedy progress north of the South Plume Optimization Wells and to verify uranium concentrations south of the Optimization Wells. The uranium plume map for the first half of 2003 has been revised to reflect direct-push sampling results.

- Analysis of how uranium is sorbed and partitioned on Great Miami Aquifer matrix sediments - Report issued in April of 2003 titled, "Selective Sequential Extraction Analysis of Uranium in Great Miami Aquifer Sediment Samples, Fernald DOE site, Ohio."

- In Situ Reactive Zone (IRZ) Study - Work continued on bench scale testing. A report is expected out during the second half of 2003.

- Comprehensive Groundwater Strategy Report – Issued on June 30, 2003.

- Plugging and abandonment of 13 groundwater monitoring wells.

Waste Storage Area

Monitoring Well 2649 is located at the southeast corner of the Clearwell; refer to Figure 2-3. Prior to 2003, the maximum uranium concentration measured at this well was 15.3 µg/L (an unfiltered sample collected on March 26, 2002). On January 13, 2003 a filtered sample collected from this well had a uranium concentration of 35.2 µg/L. A preliminary result from a filtered sample collected in July of 2003 indicates a uranium concentration of 34.7 µg/L. The water level in this area fluctuated between 517.7 feet above mean sea level (amsl) to 520.1 feet amsl in 2003. This fluctuation appears to be consistent with previous years. Leakage from the clear well most likely caused this increase. The data from Monitoring Well 2649 will be considered in the design of the Waste Storage Area Phase II Groundwater Restoration Module.

Two Type 8 groundwater monitoring wells in the Pilot Plant Drainage Ditch Plume had maximum uranium concentrations, higher than previously measured (refer to Figure 2-3). Type-8 groundwater monitoring wells are Continuous Multichannel Tubing (CMT) wells. Each CMT well has six different sampling screens located at different depths in the aquifer. The numbering for the channels increases with depth, Channel 1 being the shallowest. Channel 1 in Monitoring Well 83124 had a filtered maximum uranium concentration of 1070 µg/L and Channel 1 in Monitoring Well 83117 had a filtered maximum uranium concentration of 1160 µg/L. Both concentrations are up about 200 µg/L from previously measured maximum high uranium concentrations. Previous high uranium concentrations from both wells were also found in samples collected from Channel 1. Water levels at both locations have been higher in the past than they were in 2003. Both of these monitoring wells are within capture of nearby Waste Storage Area Phase I Extraction Wells.

South Field Area

A replacement well for Extraction Well 31562 (EW-21) was installed approximately 50 feet east of the location of the old well; refer to Figure 2-4. The old well was abandoned due to the need for frequent, high-cost rehabilitations. The new well (Extraction Well 33298 (EW-21A) has a larger diameter screen and larger screen openings. The replacement well began operating in July of 2003.

Installation of South Field Phase II Module components (four new extraction wells: 33262 [EW-15A], 33264 [EW-30], 33265 [EW-31], and 33266 [EW-32]; one new re-injection well: 33263 [IW-29]; one conversion from an extraction to a re-injection well: 31563 [IW-16]; and one injection pond) were completed during the first half of 2003. These components began operating in July 2003.

The uranium concentration measured at Monitoring Well 2397 in 2003 increased sharply over the concentration measured in 2002; refer to Figure 2-4. On June 4, 2002 the filtered uranium concentration was measured at 244 µg/L. On June 4, 2003 the filtered uranium concentration was measured at 737 µg/L. This monitoring well is located adjacent to Extraction Well 33061 (EW-25) just southeast of the Storm Water Retention Basin; refer to Figures 2-3 and 2-4. The increased uranium concentration at Monitoring Well 2397 over the course of a year is attributed to the operation of Extraction Well 33061. Extraction Well 33061 was placed in service on May 7, 2002. Pumping in Extraction Well 33061 is moving more dissolved uranium past the well screen in Monitoring Well 2397. High water level is not associated with the increase in uranium concentration. The water level in Monitoring Well 2397 when the June 2002 sample (244 µg/L) was collected was three feet higher than it was when the June 2003 sample (737 µg/L) sample was collected (518.85 feet amsl compared to 515.85 feet amsl, respectively).

Monitoring Well 2375 was added to the IEMP in January 2003. The uranium concentration measured at Monitoring Well 23275 in the first half of 2003 (152 µg/L, unfiltered) is a higher concentration than what was mapped for the location at the end of 2002. This well is located east of the Southern Waste Units area just east of the Storm Sewer Outfall ditch. The fourth quarter 2002 map had the spot where this well is now located in an area of the plume that was below 100 µg/L. The location is now mapped as being in an area of the plume that is above 100 µg/L; refer to Figures 2-3 and 2-4.

The uranium concentration at Monitoring Well 2049 rose 21.9 feet between November 20, 2002 and January 27, 2003 (from 90.1 µg/L to 112.0 µg/L) with a corresponding rise in water level of approximately 0.6 feet (513.37 feet amsl to 513.99 feet amsl). This well is located south of the Southern Waste Units in the eastern portion of the South Field Plume. The fourth quarter 2002 map had the well

located in an area of the plume that was below 100 µg/L. The well is now mapped as being in an area of the plume that is above 100 µg/L; refer to Figures 2-3 and 2-4.

Off-Property South Plume Area

Direct-push sampling was conducted at off-property locations, South of Willey Road, as a follow-up to direct-push sampling that was conducted last year. The sampling focused on the area immediately north of and south of the South Plume Optimization Wells, to status continuing remediation progress north of the Optimization Wells and to establish uranium concentrations south of the Optimization Wells in the location of a possible stagnation zone. Access to locations south of the Optimization Wells was limited by rugged, wooded terrain, and soggy soil conditions. These conditions led to several delays in field operations. Data collected through June 2003 are incorporated into Figures 2-2, 2-3, and 2-4.

The data indicate that the concentration of much of the uranium plume in the area north of and south of the South Plume Optimization wells is no longer above 100 µg/L. Pumping has decreased uranium concentrations north of the Optimization Wells down below 100 µg/L with the exception of a small area just north-east of the wells. Data collected south of the Optimization Wells indicate that only a small area of the plume (near Direct Push-Location 12235) is above 100 µg/L uranium. Data from Location 12235 are over five years old. This location will be re-sampled in the near future to verify whether or not the uranium concentration is still above 100 µg/L.

Analysis of How Uranium is Sorbed and Partitioned on Great Miami Aquifer Matrix Sediments

A report was issued in April of 2003 which presents the results of a sequential extraction analysis conducted by Sandia National Laboratories, Carlsbad New Mexico Complex, on aquifer sediments samples collected from the South Plume, Pilot Plant Drainage Ditch Plume, the leading edge of the South Field Plume, and the trailing edge of the South Field Plume. The extractions sequentially stripped uranium fractions from different components of the sediment samples. The uranium fractions released in the different steps of the sequential extraction were used to evaluate how uranium is partitioned among the mineral phases in the sediment and to estimate the amount of mobile uranium present.

Readily exchanged uranium (bound by ion exchange or weakly sorbed onto mineral surfaces) was extracted and measured first. Then in successive extractions, the uranium released from carbonate minerals, amorphous oxyhydroxides, organic phases, and crystalline oxides was measured. The final residue was then crushed and digested with hydrofluoric acid to dissolve the remaining silicates and refractory phases.

There was little labile uranium present in the uncontaminated sediments; however, in contaminated aquifer sediments, readily exchanged uranium (bound by ion exchange or weekly sorbed onto mineral surfaces) comprises about 25 percent of the available uranium mass. Approximately 40 percent of the uranium is weakly bound to carbonate minerals, organic material, and amorphous can crystalline iron oxyhydroxides phases. Nearly 35 percent of the uranium mass in the sediment is immobile to the oxidizing and carbonate-rich groundwater. The greatest uncertainty in predicting the future mobility of uranium lies with the 40-percent fraction that is weakly bound to a variety of solid phases. This uranium mass is likely to be released very slowly, and Phase II studies are underway to investigate the kinetics associated with the release of this less mobile uranium mass.

In Phase II, desorption and dissolution kinetics are being investigated by conducting batch experiments using uranium contaminated aquifer sediments and GMA groundwater spiked with varying levels of uranium. The objective of the work is to examine the rate at which uranium will be released from the sediments and the rate at which the dissolved uranium concentration will rebound after the current restoration techniques lower uranium levels in the aquifer to less than 0.03 mg/L.

Additionally, microscopy studies on select aquifer sediment samples are being conducted to assess how uranium is sequestered in the mineral structure. The primary focus is uranium associated with carbonate-minerals and iron oxyhydroxide phases, and this assessment is being performed using a combination of High Resolution Transmission Electron Microscopy (HRTEM) and Secondary Ion Mass Spectrometry (SIMS). Results from the Phase II studies will be available in late 2004.

In Situ Reactive Zone (IRZ) Study

As of the end of the reporting period, work continues on a bench scale test that is designed to demonstrate the efficacy of enhanced anaerobic reductive precipitation (EARP) technology for precipitating uranium from contaminated groundwater at the site. EARP enhances the natural biological reactions in the groundwater through addition of food-grade substances (typically molasses) to drive the oxidative-reductive potential of the groundwater to a lower, more reduced state, thereby precipitating uranium from solution. This work is being sponsored by the U.S. Department of Energy, National Energy Technology Laboratory. Results of this study will be discussed with EPA and OEPA in late 2003.

Comprehensive Groundwater Strategy Report

This draft report was prepared for DOE by Fluor Fernald, Inc. per a contract requirement. The report presents various alternatives for the ongoing aquifer restoration and wastewater/groundwater treatment activities at the FCP. The purpose behind developing the various alternatives at this time is to identify the most cost-effective infrastructure to remain at site closure (June 2006), when all the other FCP projects are complete.

The draft report was submitted to DOE in June. Initial discussions with the regulators and the public concerning the various alternatives were held in October 2003. These discussions culminated in an identified path forward to work collaboratively with the Fernald Citizens Advisory Board (FCAB) and the site regulators (EPA and OEPA) to determine the most appropriate course of action for the ongoing aquifer restoration and water treatment activities at the FCP. A decision regarding the future aquifer restoration and wastewater treatment approach is anticipated in 2004, and will follow the site's CERCLA regulatory and public participation decision-making process.

Plugging and Abandonment of Several Groundwater Monitoring Wells

Thirteen groundwater monitoring wells installed in the Great Miami Aquifer were plugged and abandoned during the first half of 2003. Recent camera surveys indicated that Monitoring Wells 3009, 2015, 2020, 2068, 2070, 2011, and 4011 were leaking. Monitoring Wells 2417 and 3417 were in the way of Cell 7 construction activities, and Monitoring Wells 2037, 3037, 2949, and 2951 were in the way of Solid Waste Landfill excavation activities. The wells were sampled prior to being plugged and abandoned.

Updated Uranium Plume Map

Uranium concentration data collected through the first half of 2003 were used to update the maximum total uranium concentration map from the fourth quarter of 2002. Figure 2-2 presents direct-push data that have been collected through June of 2003. Figures 2-3 and 2-4 present the highest uranium concentration for each monitoring well that was sampled during the reporting period, and the average pumped water uranium concentration measured at each operating extraction well during the first half of 2003. Unfiltered sample results were normally posted for monitoring wells, but when the sample turbidity is high, filtered results are used. At a minimum, all direct-push samples are filtered through a 5-micron filter.

TABLE 2-1

AQUIFER RESTORATION SYSTEM OPERATIONAL SUMMARY SHEET

	Reporting Period					
	January 2003 through June 2003			August 1993 through June 2003		
	Gallons Pumped/Re-Injected (Mgal)	Total Uranium Removed/Re-Injected (lbs)	Uranium Removal Index (lbs/Mgal)	Gallons Pumped/Re-injected (Mgal)	Total Uranium Removed/Re-Injected (lbs)	Uranium Removal Index (lbs/Mgal)
South Field (Phase I) Extraction Module	354.364	223.0	0.63	4498.783	2793.24	0.62
Waste Storage Area Module	276.292	203.20	0.74	602.332	564.55	0.94
South Plume Module	335.241	66.45	0.20	7677.181	1636.72	0.21
Re-Injection Module	65.935	2.130	NA[a]	1312.999	56.08	NA[a]
Aquifer Restoration Systems Totals						
Extraction Wells	965.897	492.65	0.51	12778.296	4994.510	0.39
(Re-Injection Wells)	65.935	2.13	NA[a]	1312.999	56.08	NA[a]
Net	899.962	490.52	NA[a]	11465.297	4938.430	NA[a]

[a]NA = not applicable

TABLE 2-2

SOUTH FIELD (PHASE I) EXTRACTION MODULE OPERATIONAL SUMMARY SHEET (JANUARY THROUGH JUNE 2003)

Extraction Well	31565[a,b] (EW-13)	31564[b,c] (EW-14)	31566[b,d] (EW-15)	31563[b,e] (EW-16)	31567[f,g] (EW-17)	31550[g,h] (EW-18)	31560[g,i] (EW-19)	31561[g,j] (EW-20)	31562[g,k] (EW-21)	32276[g] (EW-22)	32447[b,g] EW-23)	32446[g,l] (EW-24)	33061[b,g,m] (EW-25)
Baseline Remedial Strategy Report Target Pumping Rates (gpm)													
	200	200	200	200	100	100	100	100	100	200	NA	NA	NA
Average Pumping Rates (gpm)													
January	NA	NA	NA	NA	266	89	82	80	164	326	274	196	223
February	NA	NA	NA	NA	20	8	107	8	210	318	285	197	22
March	NA	NA	NA	NA	58	24	114	24	80	328	280	49	64
April	NA	NA	NA	NA	258	107	101	106	0	316	266	191	280
May	NA	NA	NA	NA	181	72	70	72	0	214	185	130	194
June	NA	NA	NA	NA	63	106	102	102	0	322	272	198	292
Average	NA	NA	NA	NA	141	68	96	65	76	304	260	160	179
Average Total Uranium Concentrations[n] (µg/L)													
January	NA	NA	NA	NA	29.7	40.6	54.4	45.3	72.5	89.7	137.3	67.0	53.0
February	NA	NA	NA	NA	NA	NA	48.4	69.1	68.3	87.6	130.5	60.6	NA
March	NA	NA	NA	NA	43.3	53.9	51.0	34.9	74.3	95.3	128.2	75.2	58.8
April	NA	NA	NA	NA	32.8	47.4	54.7	40.2	NA	85	122.2	68.6	57.5
May	NA	NA	NA	NA	33.3	51.4	51.5	36.5	NA	107.7	124.0	68.1	61.5
June	NA	NA	NA	NA	29.8	47.2	51.5	36.8	NA	92.6	112.8	63.1	57.7
Average	NA	NA	NA	NA	33.8	48.1	51.9	43.8	71.7	93.0	125.8	67.1	57.7
Uranium Removal Index (Pounds of Total Uranium Removed/Million Gallons Pumped)													
January	NA	NA	NA	NA	0.25	0.34	0.45	0.38	0.61	0.75	1.15	0.56	0.44
February	NA	NA	NA	NA	NA	NA	0.40	0.58	0.57	0.73	1.09	0.51	NA
March	NA	NA	NA	NA	0.36	0.45	0.43	0.29	0.62	0.80	1.07	0.63	0.49
April	NA	NA	NA	NA	0.27	0.40	0.46	0.34	NA	0.71	1.02	0.57	0.48
May	NA	NA	NA	NA	0.28	0.43	0.43	0.30	NA	0.90	1.03	0.57	0.51
June	NA	NA	NA	NA	0.25	0.39	0.43	0.31	NA	0.77	0.94	0.53	0.48
Average	NA	NA	NA	NA	0.28	0.40	0.43	0.37	0.60	0.78	1.05	0.56	0.48

TABLE 2-2
(Continued)

	Average Module Pumping Rate	Water Pumped by Module (Mgal) (gpm)	Total Uranium Concentration from Module° (µg/L)
January	1701	76.467	72.5
February	1175	45.853	82.8
March	1018	46.687	89.2
April	1625	72.188	68.8
May	1119	49.946	69.6
June	1458	63.223	72.9
	Average 1349	Total 354.364	Average 76.0

[a]Well 31565 was removed from service on May 22, 2001
[b]NA = not applicable
[c]Well 31564 was removed from service on December 19, 2001
[d]Well 31566 was removed from service on August 7, 1998
[e]Well 31563 was removed from service on December 9, 2002. It has been converted into a re-injection well
[f]The target pumping rate for Well 31567 was increased from 100 gpm to 250 gpm on August 8, 2000. Well was off from February 3 to March 25, 2003 to help meet the uranium discharge limit at the Parshall Flume. Well was off from June 7 to June 14, 2003 for chlorination.
[g]All Extraction Wells in the South Field Module were off from May 9 to May 19 to facilitate construction tie-ins for new wells
[h]Well 31550 was of from January 14 to January 21, 2003, and February 2 to March 25, 2003 to help meet the uranium discharge limit at the Parshall Flume. Well was off from June 4 to June 6, 2003 for chlorination.
[i]Well 31560 was off from January 14 to January 21, 2003 to help meet the uranium discharge limit at the Parshall Flume. Well was off from June 4 to June 7, 2003 for chlorination.
[j]Well 31561 was off from January 14 to January 21, 2003 and February 3 to March 25 to help meet the uranium discharge limit at the Parshall Flume. Well was off from June 15 to June 17 for chlorination.
[k]The target pumping rate for Well 31562 was increased from 200 gpm to 290 gpm on September 14, 2000. Well was off from January 6 to January 14, 2003 for pump maintenance. Well was turned off again on March 13, 2003 due to bad pump, and remained off for the rest of the reporting period. Decision was made to replace this well.
[l]Well 32446 was off from March 1, to March 25, 2003 to help meet the uranium discharge limit at the Parshall Flume.
[m]Well 33061 was off from January 13, to January 21, 2003 and February 2, to March 25, 2003 to help meet the uranium discharge limit at the Parshall Flume.
[n]Average is from weekly measurements.
°Average is calculated from individual well total uranium concentrations and flow rates.

TABLE 2-3

SOUTH PLUME MODULE OPERATIONAL SUMMARY SHEET (JANUARY THROUGH JUNE 2003)

Extraction Well	3924 (RW-1) [a,b,c]	3925 (RW-2)[b,d]	3926 (RW-3)[b,e]	3927 (RW-4)[b,f]	32308 (RW-6)[a,b,g]	32309 (RW-7)[a,b,h]
	Baseline Remedial Strategy Report Target Pumping Rates (gpm)					
	300	300	400	400	250	250
	Average Pumping Rates (gpm)					
January	218	268	324	364	78	46
February	273	261	329	486	0	0
March	295	230	308	480	62	61
April	0	199	249	446	119	119
May	134	132	54	258	84	124
June	306	153	214	395	278	298
Average	204	207	246	405	104	108
	Average Total Uranium Concentrations (µg/L)					
January	31.5	24.4	29.9	2.6	55.0	53.3
February	27.9	23.9	28.3	2.6	NA	NA
March	25.9	23.8	31.1	2.9	60.9	56.0
April	0.0	22.1	34.5	3.0	54.0	56.1
May	19.6	21.9	34.9	3.0	46.3	54.5
June	22.0	22.9	38.7	2.8	42.9	49.9
Average	21.2	23.2	32.9	2.8	51.8	54.0
	Uranium Removal Index (Pounds of Total Uranium Removed/Million Gallons Pumped)					
January	0.26	0.20	0.25	0.02	0.46	0.44
February	0.23	0.20	0.24	0.02	NA	NA
March	0.22	0.20	0.26	0.02	0.51	0.47
April	NA	0.18	0.29	0.03	0.45	0.47
May	0.16	0.18	0.29	0.03	0.39	0.45
June	0.18	0.19	0.32	0.02	0.36	0.42
Average	0.21	0.19	0.27	0.02	0.43	0.45

	Average Module Pumping Rate (gpm)	Water Pumped by Module (Mgal)	Total Uranium Concentration from Module[i] (µg/L)
January	1,298	60.741	23.7
February	1,349	55.344	19.5
March	1,436	62.936	21.8
April	1,131	49.463	24.2
May	786	35.579	23.9
June	1645	71.178	28.2
	1,274	335.241	23.6

[a]NA = not applicable
[b]All Extraction Wells in the South Plume Module were off from May 9 to May 19, 2003 to facilitate construction tie-ins for new wells.
[c]Well 3924 was off from March 31 to May 7, 2003 for maintenance.
[d]Well 3925 was off from June 17 to June 23, 2003 for chlorination, and from June 28 to June 30, 2003 for repairs to electrical components.
[e]Well 3926 was off from May 8 to June 12, 2003 for maintenance.
[f]Well 3927 was off from January 1 to January 9, 2003 to help meet the uranium discharge limit at the Parshall Flume. Well was also off from June 22 to June 24, 2003 for repairs to instrumentation.
[g]Well 32308 was off January 1, 2003, and off from January 9 to March 25, 2003, and from April 3 to April 21, 2003 and from May 3 to May 9, 2003 to help meet the uranium discharge limit at the Parshall Flume. Well was off from May 26 to June 2, 2003 for chlorination.
[h]Well 32309 was off on January 1, 2003, and from January 7 to March 25, 2003, and from April 3 to April 21, 2003 and from May 3 to May 9, 2003 to help meet the uranium discharge limit at the Parshall Flume.
[i]Average is calculated from individual well total uranium concentrations and flow rates.

TABLE 2-4

RE-INJECTION MODULE OPERATIONAL SUMMARY SHEET (JANUARY THROUGH JUNE 2003)

Re-Injection Well	33253 (IW-8a)[a,b]	33254 (IW-9a)[a,b]	22109 (IW-10)[a,b]	33255 (IW-10a)[a,b,c]	22240 (IW-11)[a,b]	22111 (IW-12)[a,b]
	Baseline Remedial Strategy Report Target Re-Injection Rates (gpm)					
	200	200	200	NA	200	200
	Average Re-Injection Rates (gpm)					
January	0	0	0	0	0	0
February	0	0	0	0	0	0
March	0	0	0	0	0	0
April	30	77	78	0	75	23
May	47	65	64	62	61	66
June	132	150	146	157	141	126
Average	35	49	48	37	46	36

	Average Module Re-Injection Rate (gpm)	Water Re-Injected By Module (Mgal)	Total Uranium Concentration To Module[d] (µg/L)
January	0	0	NA
February	0	0	NA
March	0	0	NA
April	283	13.842	3.17
May	364	15.408	6.40
June	142	36.685	2.90
	Average 131.5	Total 65.935	Average 4.16

[a]All Re-Injection Wells were off from January 1 to mid-April, and from April 25 to April 27, and from May 1 to May 21, 2003 to help meet the uranium discharge limit at the Parshall Flume, and to facilitate construction tie-ins for new wells.
[b]All Re-Injection Wells were off from June 9 to June 13 to facilitate brine and eluate line isolation.
[c]Well 33255 began operating for the first time on May 22, 2003.
[d]Average is calculated from injectate treatment facility daily uranium concentrations and individual well injection rates.

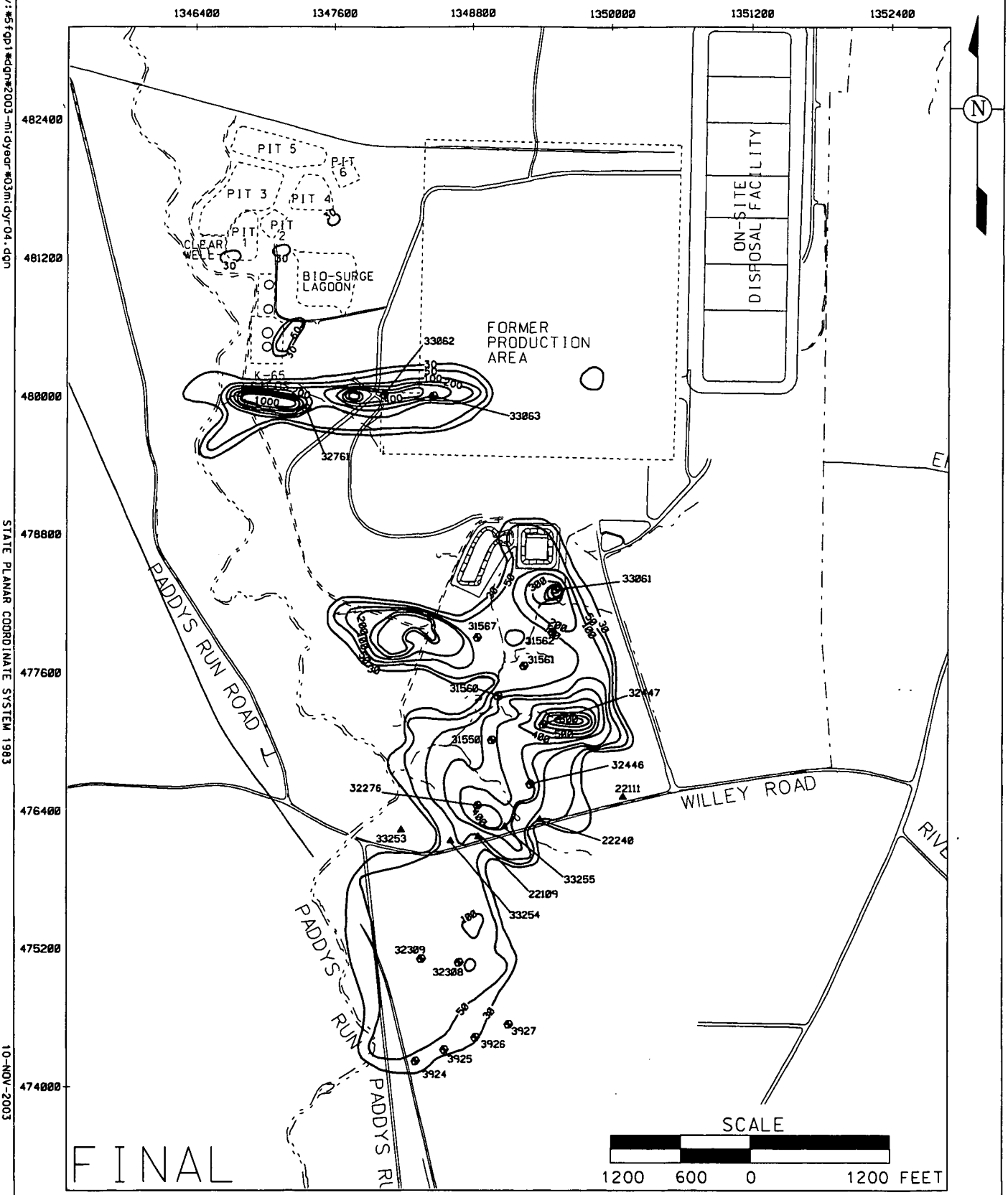
TABLE 2-5

WASTE STORAGE AREA MODULE OPERATIONAL SUMMARY SHEET (JANUARY THROUGH JUNE 2003)

Extraction Well	32761 (EW-26)[a]	33062 (EW-27)[b]	33063 (EW-28)[c]
	Baseline Remedial Strategy Report Target Pumping Rates (gpm)		
	300	300	400
	Average Pumping Rates (gpm)		
January	298	400	399
February	292	390	389
March	300	398	397
April	270	319	327
May	293	392	392
June	274	354	394
Average	288	376	383
	Average Total Uranium Concentrations (µg/L)		
January	105.5	123.9	78.5
February	98.9	112.3	67.1
March	100.8	108.7	65.5
April	87.2	92.9	72.1
May	89.2	101.3	57.8
June	79.7	93.1	51.5
Average	93.6	105.4	65.4
	Uranium Removal Index (Pounds of Total Uranium Removed/Million Gallons Pumped)		
January	0.88	1.03	0.66
February	0.83	0.94	0.56
March	0.84	0.91	0.55
April	0.73	0.78	0.60
May	0.74	0.85	0.48
June	0.67	0.78	0.43
Average	1.18	1.65	1.46

	Average Module Pumping Rate	Water Pumped by Module (Mgal)	Total Uranium Concentration From Module[d] (mg/L)
January	1097	49.038	102.4
February	1071	43.947	95.9
March	1096	48.735	90.9
April	916	42.748	83.8
May	1077	48.156	82.2
June	1022	43.668	73.5
	Average 1046.5	Total 276.292	Average 88.12

[a]Well 32761 was off from June 24 to June 26, 2003 for chlorination.
[b]Well 33062 was off from April 11 to April 14, 2003 due to an electrical outage. Well was off from June 27 to June 30, 2003 for chlorination.
[c]Well 33063 was off from April 11 to April 13, 2003 due to an electrical outage.
[d]Average is calculated from individual well total uranium concentrations and flow rates.



LEGEND:

- FCP SITE BOUNDARY
- 30 — URANIUM CONTOURS BASED ON 30 µg/L FRL, MAXIMUM GEOPROBE RESULTS, AND MAXIMUM TOTAL URANIUM DATA THROUGH THE FIRST HALF OF 2003
- EXTRACTION WELL
- INJECTION WELL

FIGURE 2-1. EXTRACTION AND INJECTION WELL LOCATION MAP

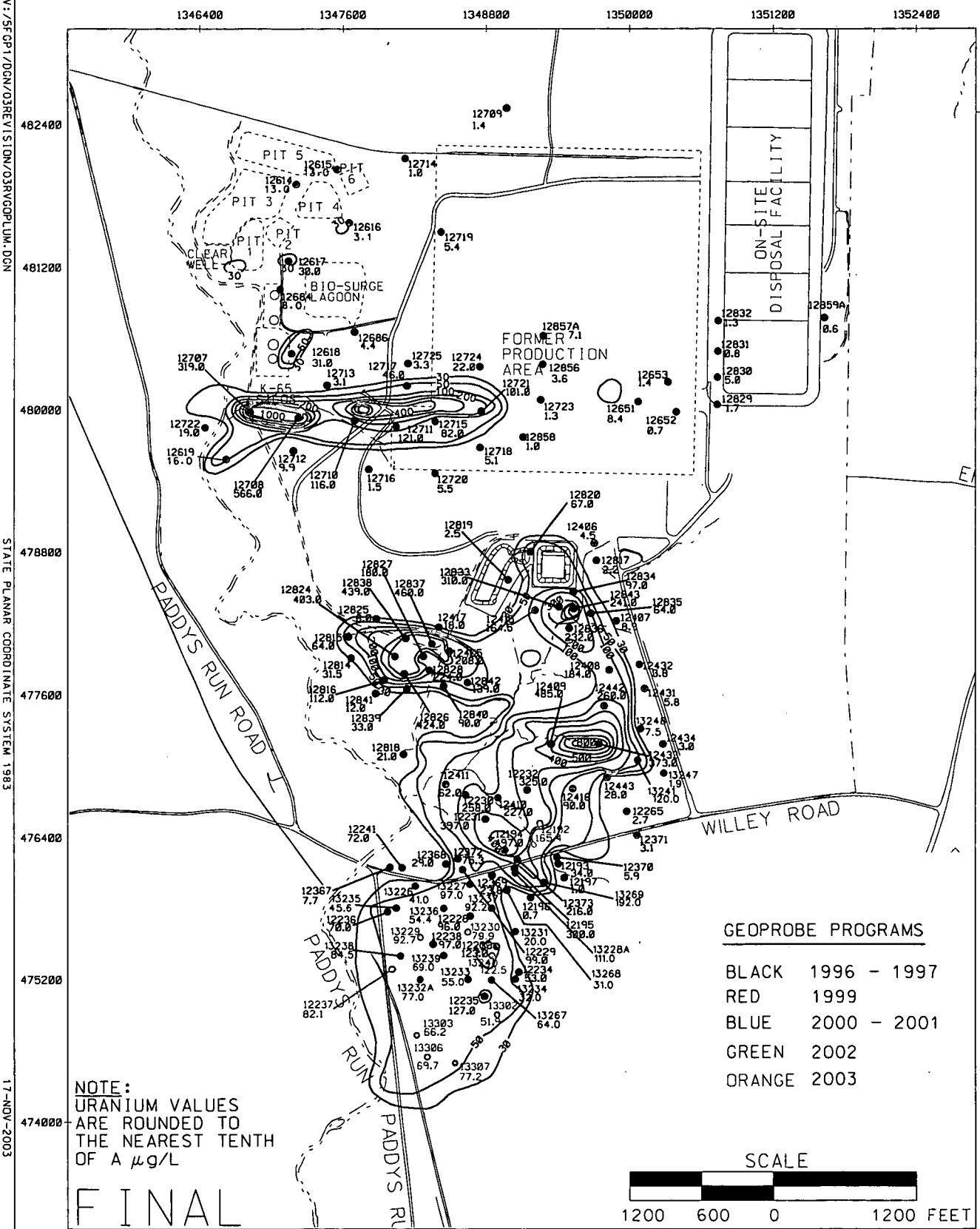


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FIGURE 2-2. DIRECT-PUSH DATA AND MAXIMUM TOTAL URANIUM PLUME THROUGH THE FIRST HALF OF 2003

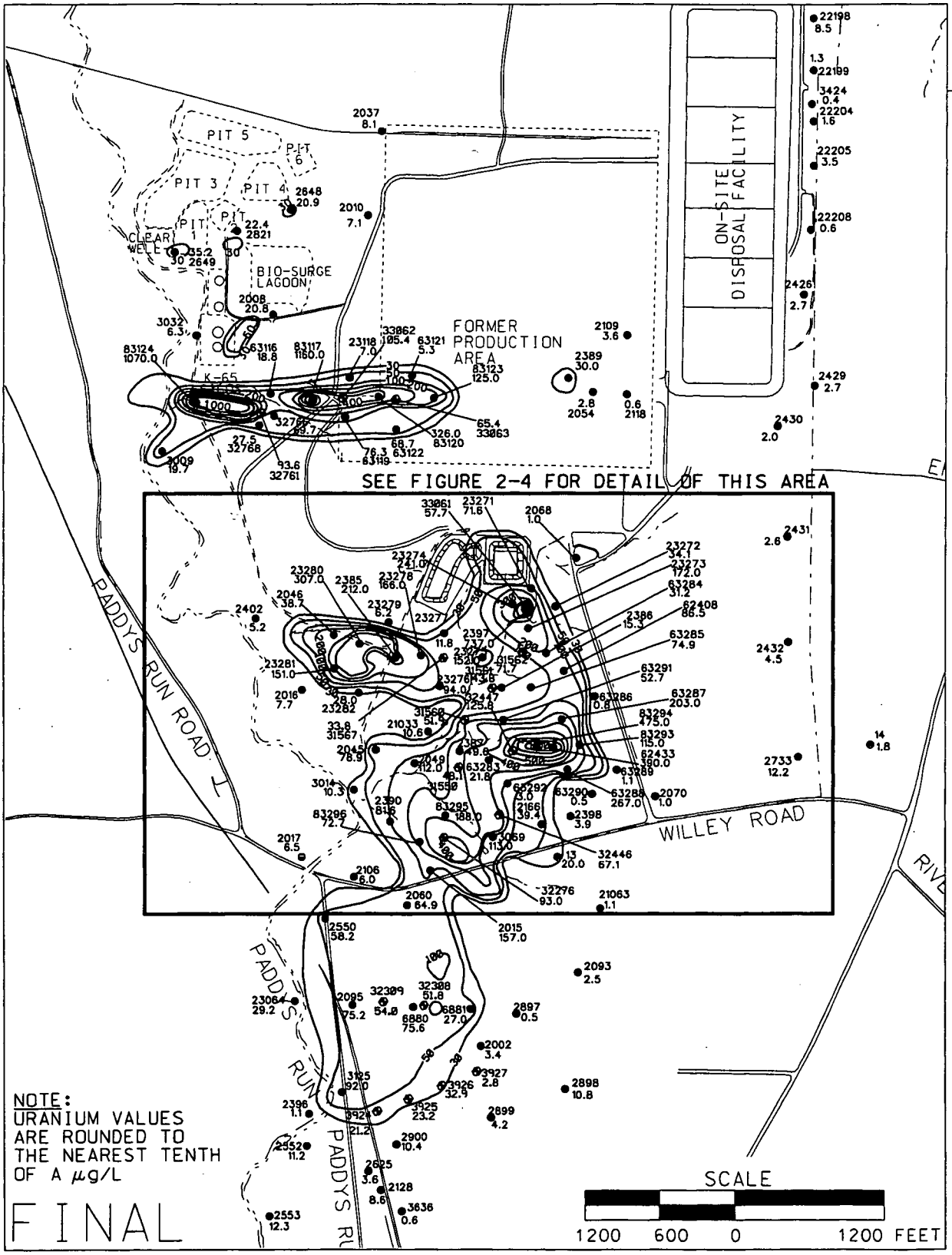
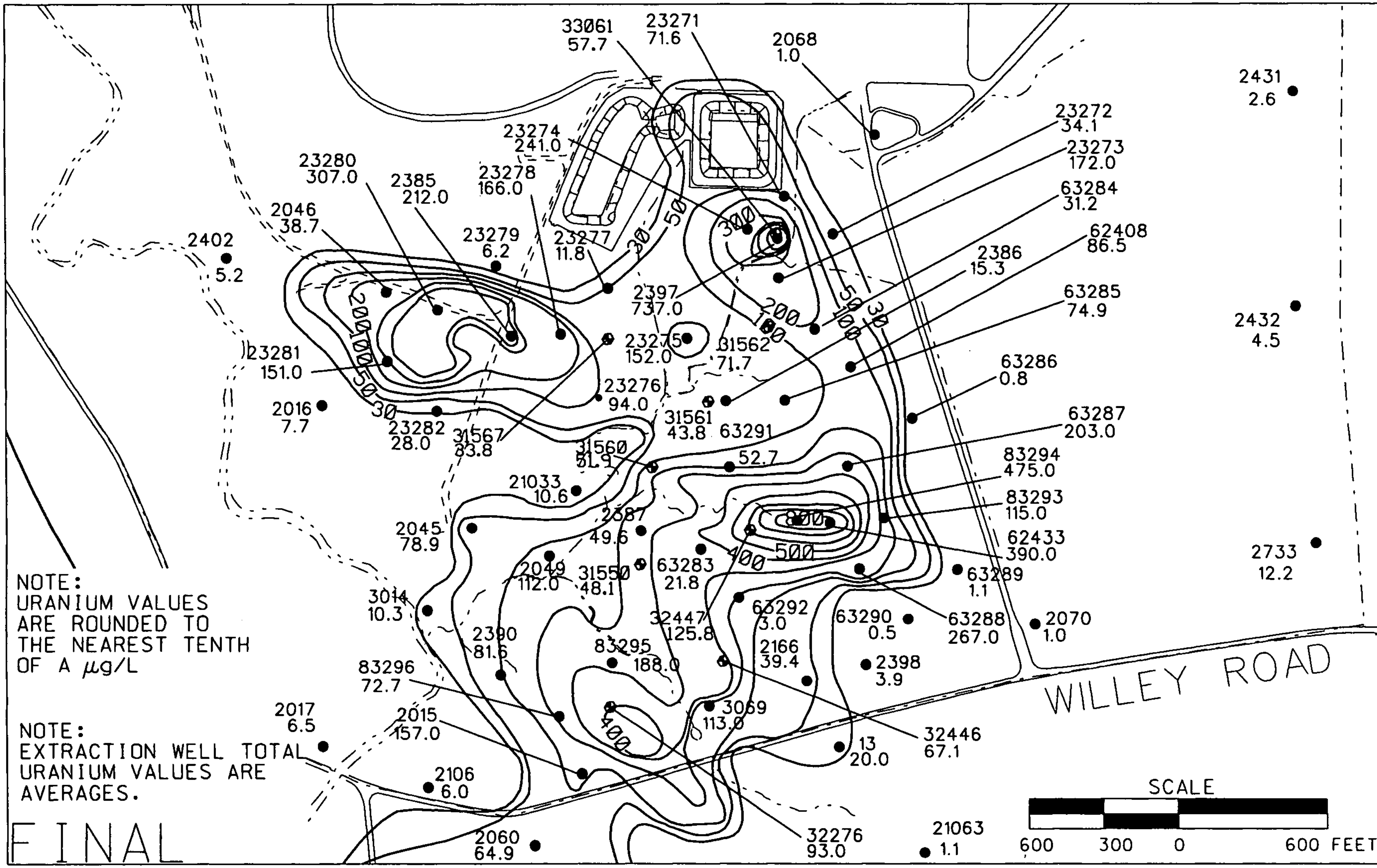


FIGURE 2-3. MONITORING WELL DATA AND MAXIMUM TOTAL URANIUM PLUME THROUGH THE FIRST HALF OF 2003



NOTE:
URANIUM VALUES ARE ROUNDED TO THE NEAREST TENTH OF A $\mu g/L$

NOTE:
EXTRACTION WELL TOTAL URANIUM VALUES ARE AVERAGES.

LEGEND:

- — · — · — FCP SITE BOUNDARY
- ● MONITORING WELL
- ⊕ EXTRACTION WELL
- 5.1 TOTAL URANIUM CONCENTRATION MEASURED IN THE FIRST HALF OF 2003
- —30— URANIUM CONTOURS BASED ON 30 $\mu g/L$ FRL, MAXIMUM GEOPROBE RESULTS, AND MAXIMUM TOTAL URANIUM DATA THROUGH THE FIRST HALF OF 2003

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FIGURE 2-4. MONITORING WELL DATA AND MAXIMUM TOTAL

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3.0 ON-SITE DISPOSAL FACILITY MONITORING DATA

3.1 DATA COVERED

This IEMP mid-year data summary covers the on-site disposal facility monitoring data collected from January 1, 2003 through June 30, 2003. Specifically, data are discussed below or provided on the IEMP Data Information Site, including:

- Leachate collection system (LCS) volumes, leak detection system (LDS) volumes, and accumulation rates.
- Perched water level data collected from the horizontal till wells for Cells 1, 2, 3, 4, 5 and Type 1 water level monitoring wells around Cell 1.
- Analytical data.

These data sets are complete in accordance with sampling requirements identified in the On-Site Disposal Facility Groundwater/Leak Detection and Leachate Monitoring Plan (DOE 1997) and subsequent agreements with the EPA and OEPA. Figure 3-1 shows those on-site disposal facility locations monitored during the first half of 2003.

3.2 NOTABLE RESULTS AND EVENTS

Notable results and events are those that impact, or could potentially impact, the scope of on-site disposal facility Leak Detection monitoring or remediation operations at the FCP. Notable results and events associated with on-site disposal facility monitoring data covered by this mid year report include the following:

- LDS Accumulation Rates: The January 2003 through June 2003 LDS accumulation rates versus precipitation for Cells 1, 2, 3, 4, and 5 are provided in Figures 3-2, 3-3, 3-4, 3-5, and 3-6 respectively. The maximum accumulation rates for Cells 1, 2, 3, 4, and 5 were 5.6, 2.0, 5.7, 25.5, and 21.0 percent, respectively, of the initial response leakage rate of 20 gallons per acre per day.
- Additional Investigation of the Cells 4 and 5 Accumulation Rates: Since the Cells 4 and 5 accumulation rates were substantially higher than the other three Cells, further investigation was warranted. Table 3-1 provides precipitation volumes that fell on Cells 4 and 5 during construction of their secondary and primary liners. The calculated volume that fell on Cells 4 and 5 during construction of their primary liner was 1,209,115 gallons and 1,139,224 gallons, respectively. A portion of the water became trapped, as construction water, in the geosynthetic clay liner on top of the cells' leak detection systems and in the geotextile cushion within the leak detection systems. The total water yield recorded for the Cells 4 and 5 leak detection systems for the January through June 2003 time period was 1,553 gallons and 1,108 gallons, respectively or about 0.13 percent and 0.1 percent, respectively of the precipitation volume that fell on Cells 4 and 5 during construction of their primary liners.

- Baseline Sampling for Cells 4, 5, and 6: Baseline sampling of the Great Miami Aquifer for these three cells continued through the reporting period. Baseline sampling of the horizontal till well for Cell 6 began in March 2003. Baseline sampling of the horizontal till wells for Cells 4 and 5 continued through the reporting period.

- New Maximum Concentrations (refer to Tables 3-2 through 3-7): The data from the first half of 2003 indicate new maximum detected concentrations as follows:

  Cell 1:
  Great Miami Aquifer – downgradient 22198
  Total Uranium - 8.48 µg/L

  Cell 2:
  No new maximums

  Cell 3:
  LDS - 12340D
  Boron - 0.381 mg/L
  LCS - 12340C
  Technetium-99 - 9.89 pCi/L

  Cell 4:
  LDS - 12341D
  Total Uranium - 13.2 µg/L
  Great Miami Aquifer - upgradient 22206
  Total Organic Carbon - 9.84 mg/L
  Total Organic Halogens - 0.0132 mg/L

  Cell 5:
  LDS - 12342D
  Total Organic Carbon - 5.32 mg/L
  Boron - 1.11 mg/L
  Total Uranium - 9.5 µg/L
  LCS - 12342C
  Technetium-99 - 9.76 pCi/L
  Total Uranium - 72.3 µg/L
  Great Miami Aquifer - downgradient 22208
  Total Uranium - 0.553 µg/L

  There are no new maximums for Cell 6 because sampling in the horizontal till well began in March 2003 and sampling in the Great Miami Aquifer began late in 2002 (i.e., only one sample collected during 2002).

- Applicable control charts were internally reviewed and updated as necessary with 2003 data. Uranium concentrations for horizontal till wells 12338 (Cell1) and 12339 (Cell 2) continue to remain "out of control"; however, concentrations have not increased and remain around 4 µg/L and 7 µg/L, respectively. As identified in the 2002 Site Environmental Report, these concentrations reflect expected perched water concentrations and are indicative of the pre-existing contamination levels at the Fernald site. LDS concentrations confirm the integrity of the primary liners for these cells.

- Glacial Overburden Water Level Monitoring: The five Type 1 well locations (13249, 13250, 13251, 13252, and 13261) around Cell 1 are presented in Figure 3-7. Water level measurements have been monitored and stored electronically on an hourly basis and data for these locations are provided in Figures 3-8 through 3-12. Additionally, water level measurements for the Cells 1 through 5 horizontal till wells have also been collected at the same frequency and are presented in Figures 3-13 through 3-17. From review of the figures, data in Figures 3-8, 3-9, 3-10, and 3-13 indicate that the perched water levels may have been high enough to come in contact with the secondary liner beneath Cell 1. For Cell 5, data shown in Figure 3-17 indicate the perched water level was generally below the secondary liner and only approached the liner elevation during March. For all other cells the perched water levels are generally well below the secondary liner elevations, as evidenced by the horizontal till well water levels shown in Figures 3-14, 3-15, and 3-16. Based on the results of the ongoing perched water level monitoring, surface water drainage improvements are being planned on the north and west sides of Cell 1. These improvements are scheduled to be completed during the winter of 2003-2004.

A thorough review of the on-site disposal facility monitoring data covered by this mid-year data summary was conducted to identify the notable results as presented in associated tables and figures. All data covered by this mid-year summary are available on the IEMP Data Information Site.

TABLE 3-1

PRECIPITATION DURING CONSTRUCTION OF CELLS 4 AND 5 SECONDARY AND PRIMARY LINERS

Activity/Item		Cell 4	Cell 5
Secondary liner construction	Start:	July 17, 2002	July 25, 2002
	Finish:	September 11, 2002	September 12, 2002
Precipitation during construction (inches)		1.37	1.09
Cell area (acres)		6.45	6.45
Precipitation volume on cell during construction (gallons)		239,377	190,453
Primary liner construction	Start:	September 11, 2002	September 13, 2002
	Finish:	October 22, 2002	October 16, 2002
Precipitation during construction (inches)		6.92	6.52
Cell area (acres)		6.45	6.45
Precipitation volume on cell during construction (gallons)		1,209,115	1,139,224
Total precipitation volume on cell during secondary and primary liner construction periods (gallons)		1,448,492	1,329,677

TABLE 3-2
ON-SITE DISPOSAL FACILITY CELL 1 DATA SUMMARY FOR MID-YEAR 2003

Note: Non-italicized pertains to total number of samples. ***Italicized/bold*** pertains to samples collected January to June 2003 only.
Shading indicates at least one detection for that constituent at that location.

Constituent (FRL)[a]	LCS[b,c,d,e] (12338C)		LDS[b,c,d,e,g] (12338D)		HTW[b,c,d,e] (12338)		Great Miami Aquifer: Upgradient[b,c,d] (22201)		Great Miami Aquifer: Downgradient[b,c,d] (22198)	
	No. of Samples with Detections / No. of Samples	Range	No. of Samples with Detections / No. of Samples	Range	No. of Samples with Detections / No. of Samples	Range	No. of Samples with Detections / No. of Samples	Range	No. of Samples with Detections / No. of Samples	Range
Total Organic Carbon (NA[g] mg/L)	19/21	ND to 123	18/21	ND to 80.9	34/41	ND to 12.2	31/37	ND to 59.7	27/36	ND to 52.5
	1/1	*18.8*	*2/2*	*6.81 to 9.36*	*0/1*	*ND*	*1/2*	*ND to 2.25*	*0/2*	*ND*
Total Organic Halogens (NA[g] mg/L)	20/22	ND to 1.52	17/21	ND to 0.361	23/41	ND to 0.077	16/37	ND to 0.308	10/36	ND to 0.0526
	2/2	*0.32 to 0.542*	*2/2*	*0.0745 to 0.0971*	*1/2*	*ND to 0.0124*	*1/2*	*ND to 0.0186*	*1/2*	*ND to 0.0111*
Boron (0.33 mg/L)	23/23	0.0642 to 2.8	20/21	ND to 0.321	35/42	ND to 0.685	31/37	ND to 0.142	41/55	ND to 0.116
	2/2	*0.965 to 1.14*	*2/2*	*0.21 to 0.259*	*2/2*	*0.226 to 0.271*	*1/2*	*ND to 0.0958*	*1/2*	*ND to 0.0682*
Mercury (0.0020 mg/L)	2/19	ND to 0.00047	1/18	ND to 0.000072	0/38	ND	0/33	ND	0/51	ND
	0/1	*ND*	*0/1*	*ND*						
Technetium-99 (94 pCi/L)	5/19	ND to 18.28	1/18	ND to 8.92	7/38	ND to 21.1	1/33	ND to 13.41	2/52	ND to 14.8
	0/1	*ND*	*0/1*	*ND*						
Total Uranium (30 µg/L)	21/22	ND to 142.186	21/21	1.5 to 23.2	40/42	ND to 19	33/37	ND to 8.33	55/55	0.557 to 8.48
	2/2	*36.6 to 55.5*	*2/2*	*6.98 to 9.22*	*2/2*	*2.75 to 3.29*	*2/2*	*3.99 to 4.99*	*2/2*	*8.41 to 8.48*
Alpha-chlordane (2.0 µg/L)	0/19	ND	0/18	ND	0/38	ND	0/33	ND	0/34	ND
	0/1	*ND*	*0/1*	*ND*						
Bis(2-chloroisopropyl)ether (5.0 µg/L)	0/19	ND	0/18	ND	0/38	ND	0/33	ND	0/34	ND
	0/1	*ND*	*0/1*	*ND*						
Bromodichloromethane (100 µg/L)	0/20	ND	1/18	ND to 0.8	5/38	ND to 8	0/33	ND	0/34	ND
	0/1	*ND*	*0/1*	*ND*						
Carbazole (11 µg/L)	0/19	ND	0/18	ND	0/38	ND	0/33	ND	0/34	ND
	0/1	*ND*	*0/1*	*ND*						
1,1-Dichloroethene (7.0 µg/L)	0/20	ND	0/18	ND	0/38	ND	0/33	ND	0/34	ND
	0/1	*ND*	*0/1*	*ND*						
1,2-Dichloroethene (total) (NA[g] µg/L)	0/18	ND	0/18	ND	0/38	ND	0/33	ND	0/33	ND
	0/1	*ND*	*0/1*	*ND*						

TABLE 3-2
(Continued)

Constituent (FRL)[a]	LCS[b,c,d,e,f] (12338C)		LDS[b,c,d,e] (12338D)		HTW[b,c,d,e] (12338)		Great Miami Aquifer: Upgradient[b,c,d] (22201)		Great Miami Aquifer: Downgradient[b,c,d] (22198)	
	No. of Samples with Detections / No. of Samples	Range	No. of Samples with Detections / No. of Samples	Range	No. of Samples with Detections / No. of Samples	Range	No. of Samples with Detections / No. of Samples	Range	No. of Samples with Detections / No. of Samples	Range
4-Nitroaniline (NA[g] µg/L)	1/19 *1/1*	ND to 1.01[h] ***1.01***[h]	0/18 *0/1*	ND ***ND***	0/38	ND	0/33	ND	0/33	ND
Tetrachloroethene (NA[g] µg/L)	0/20 *0/1*	ND ***ND***	0/18 *0/1*	ND ***ND***	0/38	ND	1/33	ND to 1	0/33	ND
Trichloroethene (5.0 µg/L)	0/20 *0/1*	ND ***ND***	0/18 *0/1*	ND ***ND***	0/38	ND	0/33	ND	0/52	ND
Vinyl Chloride (2.0 µg/L)	0/20 *0/1*	ND ***ND***	0/18 *0/1*	ND ***ND***	0/38	ND	0/33	ND	0/34	ND

[a]From Operable Unit 5 Record of Decision, Table 9-4
[b]If there was more than one sample result per day (e.g., a duplicate sample), then only the maximum sample concentration was counted and compared to the FRL.
[c]Rejected data qualified with either an R or Z were not used in this comparison.
[d]ND = not detected
[e]LCS = leachate collection system; LDS = leak detection system; HTW = horizontal till well
[f]The LCS is also sampled for nitrate/nitrite and total dissolved solids.
[g]NA = not applicable
[h]This result represents a detect below the contract required detection limit. All other results have been non-detected.

TABLE 3-3
ON-SITE DISPOSAL FACILITY CELL 2 DATA SUMMARY FOR MID-YEAR 2003

Note: Non-italicized pertains to total number of samples. ***Italicized/bold*** pertains to samples collected January to June 2003 only.
Shading indicates at least one detection for that constituent at that location.

Constituent (FRL)[a]	LCS[b,c,d,e,f] (12339C)		LDS[b,c,d,e,g] (12339D)		HTW[b,c,d,e] (12339)		Great Miami Aquifer: Upgradient[b,c,d] (22200)		Great Miami Aquifer: Downgradient[b,c,d] (22199)	
	No. of Samples with Detections / No. of Samples	Range	No. of Samples with Detections / No. of Samples	Range	No. of Samples with Detections / No. of Samples	Range	No. of Samples with Detections / No. of Samples	Range	No. of Samples with Detections / No. of Samples	Range
Total Organic Carbon (NA[h] mg/L)	11/18	ND to 6.25	14/19	ND to 26.1	30/39	ND to 11.1	27/32	ND to 47.6	23/32	ND to 51.8
	0/1	*ND*	*0/2*	*ND*	*0/1*	*ND*	*1/2*	*ND to 1.28*	*1/2*	*ND to 1.88*
Total Organic Halogens (NA[h] mg/L)	5/19	ND to 0.0576	8/19	ND to 0.0205	28/40	ND to 0.101	14/32	ND to 0.177	10/32	ND to 0.0386
	0/2	*ND*	*2/2*	*0.0121 to 0.0123*	*2/2*	*0.0337 to 0.0429*	*1/2*	*ND to 0.013*	*0/2*	*ND*
Boron (0.33 mg/L)	19/20	ND to 2.07	19/19	0.289 to 2.22	28/40	ND to 0.0829	23/32	ND to 0.158	24/32	ND to 0.0579
	2/2	*0.456 to 1.69*	*2/2*	*0.307 to 0.426*	*2/2*	*0.0586 to 0.0677*	*1/2*	*ND to 0.0503*	*1/2*	*ND to 0.0458*
Mercury (0.0020 mg/L)	0/16	ND	0/16	ND	2/35	ND to 0.00025	0/27	ND	0/27	ND
	0/1	*ND*	*0/1*	*ND*						
Technetium-99 (94 pCi/L)	1/16	ND to 21.25	1/16	ND to 15.99	5/37	ND to 12	0/28	ND	0/28	ND
	0/1	*ND*	*0/1*	*ND*						
Total Uranium (30 µg/L)	19/19	4.51 to 68.6	19/19	8.69 to 71	40/41	ND to 6.56	20/32	ND to 1.11	32/32	0.259 to 12.1
	2/2	*26.7 to 42*	*2/2*	*14.4 to 18.9*	*2/2*	*5.16 to 5.72*	*1/2*	*ND to 1.03*	*2/2*	*0.794 to 1.26*
Alpha-chlordane (2.0 µg/L)	0/16	ND	0/16	ND	0/36	ND	0/28	ND	0/28	ND
	0/1	*ND*	*0/1*	*ND*						
Bis(2-chloroisopropyl)ether (5.0 µg/L)	0/16	ND	0/16	ND	0/36	ND	0/28	ND	0/28	ND
	0/1	*ND*	*0/1*	*ND*						
Bromodichloromethane (100 µg/L)	0/17	ND	0/16	ND	1/36	ND to 0.4	0/28	ND	0/28	ND
	0/1	*ND*	*0/1*	*ND*						
Carbazole (11 µg/L)	0/16	ND	0/16	ND	0/36	ND	0/28	ND	0/28	ND
	0/1	*ND*	*0/1*	*ND*						
1,1-Dichloroethene (7.0 µg/L)	0/17	ND	0/16	ND	0/36	ND	0/28	ND	0/28	ND
	0/1	*ND*	*0/1*	*ND*						
1,2-Dichloroethene (total) (NA[h] µg/L)	0/15	ND	0/16	ND	0/36	ND	0/28	ND	0/28	ND
	0/1	*ND*	*0/1*	*ND*						

TABLE 3-3
(Continued)

Constituent (FRL)[a]	LCS[b,c,d,e,f] (12339C)		LDS[b,c,d,e,g] (12339D)		HTW[b,c,d,e] (12339)		Great Miami Aquifer			
							Upgradient[b,c,d] (22200)		Downgradient[b,c,d] (22199)	
	No. of Samples with Detections / No. of Samples	Range	No. of Samples with Detections / No. of Samples	Range	No. of Samples with Detections / No. of Samples	Range	No. of Samples with Detections / No. of Samples	Range	No. of Samples with Detections / No. of Samples	Range
4-Nitroaniline (NA[h] µg/L)	0/16	ND	0/16	ND	0/36	ND	0/28	ND	0/28	ND
	0/1	***ND***	***0/1***	***ND***						
Tetrachloroethene (NA[h] µg/L)	0/17	ND	0/16	ND	0/36	ND	0/28	ND	0/28	ND
	0/1	***ND***	***0/1***	***ND***						
Trichloroethene (5.0 µg/L)	0/17	ND	0/16	ND	0/36	ND	0/28	ND	0/28	ND
	0/1	***ND***	***0/1***	***ND***						
Vinyl Chloride (2.0 µg/L)	0/17	ND	0/16	ND	0/36	ND	0/28	ND	0/28	ND
	0/1	***ND***	***0/1***	***ND***						

[a]From Operable Unit 5 Record of Decision, Table 9-4
[b]If there was more than one sample result per day (e.g., a duplicate sample), then only the maximum sample concentration was counted and compared to the FRL.
[c]Rejected data qualified with either an R or Z were not used in this comparison.
[d]ND = not detected
[e]LCS = leachate collection system; LDS = leak detection system; HTW = horizontal till well
[f]The LCS is also sampled for nitrate/nitrite and total dissolved solids.
[g]Cell 2 LDS data from December 1998 to present are suspect due to a December 1998/January 1999 back-up of leachate from the leachate transmission system line into the Cell 2 LDS layer and the resultant residual contamination of the LDS layer from the back-up.
[h]NA = not applicable

TABLE 3-4
ON-SITE DISPOSAL FACILITY CELL 3 DATA SUMMARY FOR MID-YEAR 2003

Note: Non-italicized pertains to total number of samples. ***Italicized/bold*** pertains to samples collected January to June 2003 only.
Shading indicates at least one detection for that constituent at that location.

Constituent (FRL)[a]	LCS[b,c,d,e,f] (12340C)		LDS[b,c,d,e] (12340D)		HTW[b,c,d,e] (12340)		Great Miami Aquifer: Upgradient[b,c,d] (22203)		Great Miami Aquifer: Downgradient[b,c,d] (22204)	
	No. of Samples with Detections / No. of Samples	Range	No. of Samples with Detections / No. of Samples	Range	No. of Samples with Detections / No. of Samples	Range	No. of Samples with Detections / No. of Samples	Range	No. of Samples with Detections / No. of Samples	Range
Total Organic Carbon (NA[g] mg/L)	9/15	ND to 34.2	0/3	ND	21/34	ND to 9.81	16/30	ND to 14.1	14/30	ND to 8.83
	0/1	***ND***	***0/1***	***ND***	***0/1***	***ND***	***1/2***	***ND to 1.97***	***0/2***	***ND***
Total Organic Halogens (NA[g] mg/L)	3/16	ND to 0.178	0/3	ND	28/35	ND to 0.158	13/30	ND to 0.213	9/31	ND to 0.165
	0/2	***ND***	***0/1***	***ND***	***2/2***	***0.0439 to 0.0459***	***1/2***	***ND to 0.0209***	***0/2***	***ND***
Boron (0.33 mg/L)	16/17	ND to 2.25	3/3	0.317 to 0.381	30/34	ND to 0.24	21/30	ND to 0.0776	22/30	ND to 0.179
	2/2	***0.199 to 0.302***	***1/1***	***0.381***	***2/2***	***0.1 to 0.107***	***1/2***	***ND to 0.0406***	***1/2***	***ND to 0.0382***
Mercury (0.0020 mg/L)	0/13	ND	0/1	ND	1/30	ND to 0.00026	0/25	ND	2/25	ND to 0.00028
	0/1	***ND***	***0/1***	***ND***						
Technetium-99 (94 pCi/L)	1/13	ND to 9.89	0/1	ND	2/30	ND to 38.35	1/26	ND to 8.438	0/26	ND
	1/1	***9.89***	***0/1***	***ND***						
Total Uranium (30 µg/L)	16/16	9.27 to 83.7	3/3	15.1 to 27.3	32/34	ND to 25.4	25/30	ND to 7.92	28/30	ND to 5.924
	2/2	***16.6 to 18.4***	***1/1***	***21.5***	***2/2***	***18.7 to 22.6***	***2/2***	***0.832 to 4.6***	***2/2***	***1.04 to 1.56***
Alpha-chlordane (2.0 µg/L)	0/13	ND	0/1	ND	0/31	ND	0/26	ND	0/26	ND
	0/1	***ND***	***0/1***	***ND***						
Bis(2-chloroisopropyl)ether (5.0 µg/L)	0/13	ND	0/1	ND	0/31	ND	0/26	ND	0/26	ND
	0/1	***ND***	***0/1***	***ND***						
Bromodichloromethane (100 µg/L)	1/14	ND to 0.5	0/1	ND	0/30	ND	0/26	ND	0/26	ND
	0/1	***ND***	***0/1***	***ND***						
Carbazole (11 µg/L)	0/13	ND	0/1	ND	0/31	ND	0/26	ND	0/26	ND
	0/1	***ND***	***0/1***	***ND***						
1,1-Dichloroethene (7.0 µg/L)	0/14	ND	0/1	ND	0/30	ND	0/26	ND	0/26	ND
	0/1	***ND***	***0/1***	***ND***						
1,2-Dichloroethene (total) (NA[g] µg/L)	0/12	ND	0/1	ND	0/30	ND	0/26	ND	0/26	ND
	0/1	***ND***	***0/1***	***ND***						

TABLE 3-4
(Continued)

Constituent (FRL)[a]	LCS[b,c,d,e,f] (12340C)		LDS[b,c,d,e] (12340D)		HTW[b,c,d,e] (12340)		Great Miami Aquifer: Upgradient[b,c,d] (22203)		Great Miami Aquifer: Downgradient[b,c,d] (22204)	
	No. of Samples with Detections / No. of Samples	Range	No. of Samples with Detections / No. of Samples	Range	No. of Samples with Detections / No. of Samples	Range	No. of Samples with Detections / No. of Samples	Range	No. of Samples with Detections / No. of Samples	Range
4-Nitroaniline (NA[g] µg/L)	0/13	ND	0/1	ND	0/31	ND	0/26	ND	0/26	ND
	0/1	*ND*	*0/1*	*ND*						
Tetrachloroethene (NA[g] µg/L)	0/14	ND	0/1	ND	0/30	ND	0/26	ND	0/26	ND
	0/1	*ND*	*0/1*	*ND*						
Trichloroethene (5.0 µg/L)	0/14	ND	0/1	ND	0/30	ND	0/26	ND	0/26	ND
	0/1	*ND*	*0/1*	*ND*						
Vinyl Chloride (2.0 µg/L)	0/14	ND	0/1	ND	0/30	ND	0/26	ND	0/26	ND
	0/1	*ND*	*0/1*	*ND*						

[a]From Operable Unit 5 Record of Decision, Table 9-4
[b]If there was more than one sample result per day (e.g., a duplicate sample), then only the maximum sample concentration was counted and compared to the FRL.
[c]Rejected data qualified with either an R or Z were not used in this comparison.
[d]ND = not detected
[e]LCS = leachate collection system; LDS = leak detection system; HTW = horizontal till well
[f]The LCS is also sampled for nitrate/nitrite and total dissolved solids.
[g]NA = not applicable

TABLE 3-5
ON-SITE DISPOSAL FACILITY CELL 4 DATA SUMMARY FOR MID-YEAR 2003

Note: Non-italicized pertains to total number of samples. ***Italicized/bold*** pertains to samples collected January to June 2003 only.
Shading indicates at least one detection for that constituent at that location.

Constituent (FRL)[a]	LCS[b,c,d,e,f] (12341C)		LDS[b,c,d,e] (12341D)		HTW[b,c,d,e] (12341)		Great Miami Aquifer: Upgradient[b,c,d] (22206)		Great Miami Aquifer: Downgradient[b,c,d] (22205)	
	No. of Samples with Detections / No. of Samples	Range	No. of Samples with Detections / No. of Samples	Range	No. of Samples with Detections / No. of Samples	Range	No. of Samples with Detections / No. of Samples	Range	No. of Samples with Detections / No. of Samples	Range
Total Organic Carbon (NA[g] mg/L)	0/1	ND	1/2	ND to 8	5/11	ND to 3.99	10/16	ND to 9.84	8/16	ND to 4.43
			0/1	***ND***	***0/2***	***ND***	***1/3***	***ND to 9.84***	***0/3***	***ND***
Total Organic Halogens (NA[g] mg/L)	1/1	0.0126	2/2	0.0225 to 0.0282	8/12	ND to 0.0193	5/16	ND to 0.0132	3/16	ND to 0.016
			1/1	***0.0225***	***2/3***	***ND to 0.0161***	***1/3***	***ND to 0.0132***	***0/3***	***ND***
Boron (0.33 mg/L)	1/1	0.767	2/2	1.21 to 1.81	11/12	ND to 1.55	15/16	ND to 0.0577	14/16	ND to 0.0586
			1/1	***1.21***	***3/3***	***0.18 to 0.205***	***3/3***	***0.0385 to 0.0495***	***2/3***	***ND to 0.0366***
Mercury (0.0020 mg/L)	0/1	ND	0/2	ND	0/12	ND	1/16	ND to 0.0167	1/16	ND to 0.000104
			0/1	***ND***	***0/3***	***ND***	***0/3***	***ND***	***0/3***	***ND***
Technetium-99 (94 pCi/L)	0/1	ND	0/2	ND	0/12	ND	0/16	ND	0/16	ND
			0/1	***ND***	***0/3***	***ND***	***0/3***	***ND***	***0/3***	***ND***
Total Uranium (30 µg/L)	1/1	4.41	2/2	5.74 to 13.2	12/12	4.89 to 7.91	16/16	0.335 to 5.78	15/15	0.446 to 19.7
			1/1	***13.2***	***3/3***	***4.89 to 7.8***	***3/3***	***0.811 to 1.01***	***2/2***	***0.599 to 3.54***
Alpha-chlordane (2.0 µg/L)	0/1	ND	0/2	ND	0/12	ND	0/16	ND	0/16	ND
			0/1	***ND***	***0/3***	***ND***	***0/3***	***ND***	***0/3***	***ND***
Bis(2-chloroisopropyl)ether (5.0 µg/L)	0/1	ND	0/2	ND	0/12	ND	0/16	ND	1/16	ND to 0.085
			0/1	***ND***	***0/3***	***ND***	***0/3***	***ND***	***0/3***	***ND***
Bromodichloromethane (100 µg/L)	0/1	ND	0/2	ND	0/12	ND	0/16	ND	0/16	ND
			0/1	***ND***	***0/3***	***ND***	***0/3***	***ND***	***0/3***	***ND***
Carbazole (11 µg/L)	0/1	ND	0/2	ND	2/12	ND to 3.66[h]	0/16	ND	1/16	ND to 0.07
			0/1	***ND***	***1/3***	***ND to 3.66[h]***	***0/3***	***ND***	***0/3***	***ND***
1,1-Dichloroethene (7.0 µg/L)	0/1	ND	0/2	ND	0/12	ND	0/16	ND	0/16	ND
			0/1	***ND***	***0/3***	***ND***	***0/3***	***ND***	***0/3***	***ND***
1,2-Dichloroethene (total) (NA[g] µg/L)	0/1	ND	0/2	ND	0/12	ND	0/16	ND	0/16	ND
			0/1	***ND***	***0/3***	***ND***	***0/3***	***ND***	***0/3***	***ND***

TABLE 3-5
(Continued)

Constituent (FRL)[a]	LCS[b,c,d,e,f] (12341C)		LDS[b,c,d,e] (12341D)		HTW[b,c,d,e] (12341)		Great Miami Aquifer: Upgradient[b,c,d] (22206)		Great Miami Aquifer: Downgradient[b,c,d] (22205)	
	No. of Samples with Detections / No. of Samples	Range	No. of Samples with Detections / No. of Samples	Range	No. of Samples with Detections / No. of Samples	Range	No. of Samples with Detections / No. of Samples	Range	No. of Samples with Detections / No. of Samples	Range
4-Nitroaniline (NA[g] µg/L)	0/1	ND	0/2	ND	0/12	ND	0/16	ND	0/16	ND
			0/1	*ND*	*0/3*	*ND*	*0/3*	*ND*	*0/3*	*ND*
Tetrachloroethene (NA[g] µg/L)	0/1	ND	0/2	ND	0/12	ND	0/16	ND	0/16	ND
			0/1	*ND*	*0/3*	*ND*	*0/3*	*ND*	*0/3*	*ND*
Trichloroethene (5.0 µg/L)	0/1	ND	0/2	ND	0/12	ND	0/16	ND	0/16	ND
			0/1	*ND*	*0/3*	*ND*	*0/3*	*ND*	*0/3*	*ND*
Vinyl Chloride (2.0 µg/L)	0/1	ND	0/2	ND	0/12	ND	0/16	ND	0/16	ND
			0/1	*ND*	*0/3*	*ND*	*0/3*	*ND*	*0/3*	*ND*

[a]From Operable Unit 5 Record of Decision, Table 9-4
[b]If there was more than one sample result per day (e.g., a duplicate sample), then only the maximum sample concentration was counted and compared to the FRL.
[c]Rejected data qualified with either an R or Z were not used in this comparison.
[d]ND = not detected
[e]LCS = leachate collection system; LDS = leak detection system; HTW = horizontal till well
[f]The LCS is also sampled for nitrate/nitrite and total dissolved solids.
[g]NA = not applicable
[h]This result represents a detect below the contract required detection limit.

TABLE 3-6
ON-SITE DISPOSAL FACILITY CELL 5 DATA SUMMARY FOR MID-YEAR 2003

Note: Non-italicized pertains to total number of samples. ***Italicized/bold*** pertains to samples collected January to June 2003 only.
Shading indicates at least one detection for that constituent at that location.

Constituent (FRL)[a]	LCS[b,c,d,e,f] (12342C)		LDS[b,c,d,e] (12342D)		HTW[b,c,d,e] (12342)		Great Miami Aquifer: Upgradient[b,c,d] (22207)		Great Miami Aquifer: Downgradient[b,c,d] (22208)	
	No. of Samples with Detections / No. of Samples	Range	No. of Samples with Detections / No. of Samples	Range	No. of Samples with Detections / No. of Samples	Range	No. of Samples with Detections / No. of Samples	Range	No. of Samples with Detections / No. of Samples	Range
Total Organic Carbon (NA[g] mg/L)	0/2	ND	1/2	ND to 5.32	6/12	ND to 5.85	9/16	ND to 3.78	9/16	ND to 14.2
	0/1	***ND***	***1/1***	***5.32***	***0/2***	***ND***	***1/3***	***ND to 1.63***	***1/3***	***ND to 1.87***
Total Organic Halogens (NA[g] mg/L)	2/3	ND to 0.0118[h]	1/2	ND to 0.0103	9/13	ND to 0.0186[h]	4/16	ND to 0.015	2/16	ND to 0.014
	1/2	***ND to 0.0118[h]***	***0/1***	***ND***	***2/3***	***ND to 0.0186[h]***	***1/3***	***ND to 0.015***	***1/3***	***ND to 0.014***
Boron (0.33 mg/L)	3/3	0.24 to 0.745	2/2	0.94 to 1.11	12/13	ND to 0.275	15/16	ND to 0.0692	13/16	ND to 0.0717
	2/2	***0.24 to 0.423***	***1/1***	***1.11***	***3/3***	***0.18 to 0.221***	***3/3***	***0.0336 to 0.0404***	***3/3***	***0.0297 to 0.0362***
Mercury (0.0020 mg/L)	0/3	ND	0/2	ND	0/13	ND	2/16	ND to 0.000523	0/16	ND
	0/2	***ND***	***0/1***	***ND***	***0/3***	***ND***	***1/3***	***ND to 0.000078***	***0/3***	***ND***
Technetium-99 (94 pCi/L)	1/3	ND to 9.76	0/2	ND	2/13	ND to 9.68	0/16	ND	1/16	ND to 12.8
	1/2	***ND to 9.76***	***0/1***	***ND***	***0/3***	***ND***	***0/3***	***ND***	***0/3***	***ND***
Total Uranium (30 µg/L)	3/3	3.39 to 72.3	2/2	2.93 to 9.5	13/13	10.3 to 21.1	16/16	0.3 to 4.48	13/16	ND to 0.553
	2/2	***27.4 to 72.3***	***1/1***	***9.5***	***3/3***	***10.3 to 15.1***	***3/3***	***0.452 to 0.644***	***2/3***	***ND to 0.553***
Alpha-chlordane (2.0 µg/L)	0/3	ND	0/2	ND	0/13	ND	0/16	ND	0/16	ND
	0/2	***ND***	***0/1***	***ND***	***0/3***	***ND***	***0/3***	***ND***	***0/3***	***ND***
Bis(2-chloroisopropyl)ether (5.0 µg/L)	0/3	ND	0/2	ND	0/13	ND	0/16	ND	0/15	ND
	0/2	***ND***	***0/1***	***ND***	***0/3***	***ND***	***0/3***	***ND***	***0/3***	***ND***
Bromodichloromethane (100 µg/L)	0/3	ND	0/2	ND	0/13	ND	0/16	ND	0/16	ND
	0/2	***ND***	***0/1***	***ND***	***0/3***	***ND***	***0/3***	***ND***	***0/3***	***ND***
Carbazole (11 µg/L)	0/3	ND	0/2	ND	1/13	ND to 0.052	0/16	ND	0/15	ND
	0/2	***ND***	***0/1***	***ND***	***0/3***	***ND***	***0/3***	***ND***	***0/3***	***ND***
1,1-Dichloroethene (7.0 µg/L)	0/3	ND	0/2	ND	0/13	ND	0/16	ND	0/16	ND
	0/2	***ND***	***0/1***	***ND***	***0/3***	***ND***	***0/3***	***ND***	***0/3***	***ND***
1,2-Dichloroethene (total) (NA[g] µg/L)	0/3	ND	0/2	ND	0/13	ND	0/16	ND	0/16	ND
	0/2	***ND***	***0/1***	***ND***	***0/3***	***ND***	***0/3***	***ND***	***0/3***	***ND***

TABLE 3-6
(Continued)

Constituent (FRL)[a]	LCS[b,c,d,e,f] (12342C)		LDS[b,c,d,e] (12342D)		HTW[b,c,d,e] (12342)		Great Miami Aquifer: Upgradient[b,c,d] (22207)		Great Miami Aquifer: Downgradient[b,c,d] (22208)	
	No. of Samples with Detections / No. of Samples	Range	No. of Samples with Detections / No. of Samples	Range	No. of Samples with Detections / No. of Samples	Range	No. of Samples with Detections / No. of Samples	Range	No. of Samples with Detections / No. of Samples	Range
4-Nitroaniline (NA[g] µg/L)	0/3	ND	0/2	ND	0/13	ND	0/16	ND	0/15	ND
	0/2	*ND*	*0/1*	*ND*	*0/3*	*ND*	*0/3*	*ND*	*0/3*	*ND*
Tetrachloroethene (NA[g] µg/L)	0/3	ND	0/2	ND	0/13	ND	0/16	ND	0/16	ND
	0/2	*ND*	*0/1*	*ND*	*0/3*	*ND*	*0/3*	*ND*	*0/3*	*ND*
Trichloroethene (5.0 µg/L)	0/3	ND	0/2	ND	0/13	ND	0/16	ND	0/16	ND
	0/2	*ND*	*0/1*	*ND*	*0/3*	*ND*	*0/3*	*ND*	*0/3*	*ND*
Vinyl Chloride (2.0 µg/L)	0/3	ND	0/2	ND	0/13	ND	0/16	ND	0/16	ND
	0/2	*ND*	*0/1*	*ND*	*0/3*	*ND*	*0/3*	*ND*	*0/3*	*ND*

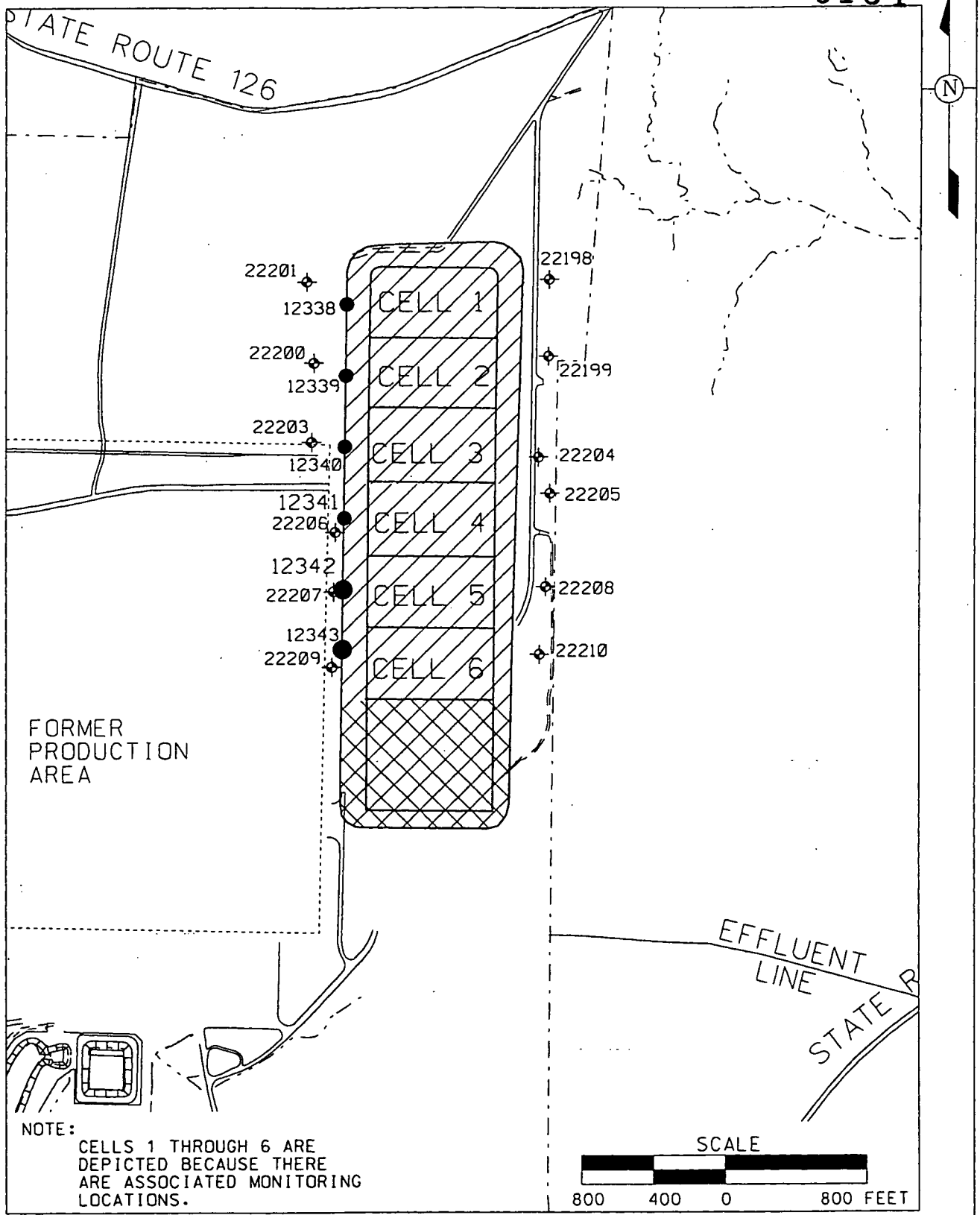
[a]From Operable Unit 5 Record of Decision, Table 9-4
[b]If there was more than one sample result per day (e.g., a duplicate sample), then only the maximum sample concentration was counted and compared to the FRL.
[c]Rejected data qualified with either an R or Z were not used in this comparison.
[d]ND = not detected
[e]LCS = leachate collection system; LDS = leak detection system; HTW = horizontal till well
[f]The LCS is also sampled for nitrate/nitrite and total dissolved solids.
[g]NA = not applicable
[h]This result represents a detect below the contract required detection limit.

TABLE 3-7
ON-SITE DISPOSAL FACILITY CELL 6 DATA SUMMARY FOR MID-YEAR 2003

Note: Non-italicized pertains to total number of samples. ***Italicized/bold*** pertains to samples collected January to June 2003 only. Shading indicates at least one detection for that constituent at that location.

Constituent (FRL)[a]	Great Miami Aquifer					
	HTW[b,c,d,e] (12343)		Upgradient[b,c,d] (22209)		Downgradient[b,c,d] (22210)	
	No. of Samples with Detections / No. of Samples	Range	No. of Samples with Detections / No. of Samples	Range	No. of Samples with Detections / No. of Samples	Range
Total Organic Carbon (NA[f] mg/L)	1/2	ND to 2.55	1/6	ND to 1.24	1/6	ND to 1.66
	1/2	***ND to 2.55***	***1/5***	***ND to 1.24***	***1/5***	***ND to 1.66***
Total Organic Halogens (NA[f] mg/L)	3/4	ND to 0.0144	1/7	ND to 0.0089	0/7	ND
	3/4	***ND to 0.0144***	***1/6***	***ND to 0.0089***	***0/6***	***ND***
Boron (0.33 mg/L)	3/4	ND to 0.0914	7/7	0.0341 to 0.0402	7/7	0.0315 to 0.0416
	3/4	***ND to 0.0914***	***6/6***	***0.0341 to 0.0402***	***6/6***	***0.0315 to 0.0416***
Mercury (0.0020 mg/L)	0/4	ND	1/7	ND to 0.00007	1/7	ND to 0.000078
	0/4	***ND***	***1/6***	***ND to 0.00007***	***1/6***	***ND to 0.000078***
Technetium-99 (94 pCi/L)	0/4	ND	0/7	ND	1/7	ND to 6.61
	0/4	***ND***	***0/6***	***ND***	***0/6***	***ND***
Total Uranium (30 µg/L)	3/4	ND to 9.15	6/7	ND to 2.38	6/7	ND to 0.795
	3/4	***ND to 9.15***	***5/6***	***ND to 2.38***	***5/6***	***ND to 0.795***
Alpha-chlordane (2.0 µg/L)	0/4	ND	0/7	ND	0/7	ND
	0/4	***ND***	***0/6***	***ND***	***0/6***	***ND***
Bis(2-chloroisopropyl)ether (5.0 µg/L)	0/4	ND	0/7	ND	0/7	ND
	0/4	***ND***	***0/6***	***ND***	***0/6***	***ND***
Bromodichloromethane (100 µg/L)	0/4	ND	0/7	ND	0/7	ND
	0/4	***ND***	***0/6***	***ND***	***0/6***	***ND***
Carbazole (11 µg/L)	0/4	ND	07	ND	0/7	ND
	0/4	***ND***	***0/6***	***ND***	***0/6***	***ND***
1,1-Dichloroethene (7.0 µg/L)	0/4	ND	0/7	ND	0/7	ND
	0/4	***ND***	***0/6***	***ND***	***0/6***	***ND***
1,2-Dichloroethene (total) (NA[f] µg/L)	0/4	ND	0/7	ND	0/7	ND
	0/4	***ND***	***0/6***	***ND***	***0/6***	***ND***
4-Nitroaniline (NA[f] µg/L)	0/4	ND	0/7	ND	0/7	ND
	0/4	***ND***	***0/6***	***ND***	***0/6***	***ND***
Tetrachloroethene (NA[f] µg/L)	0/4	ND	0/7	ND	0/7	ND
	0/4	***ND***	***0/6***	***ND***	***0/6***	***ND***
Trichloroethene (5.0 µg/L)	0/4	ND	0/7	ND	0/7	ND
	0/4	***ND***	***0/6***	***ND***	***0/6***	***ND***
1,2-Dichloroethene (total) (NA[f] µg/L)	0/4	ND	0/7	ND	0/7	ND
	0/4	***ND***	***0/6***	***ND***	***0/6***	***ND***

[a]From Operable Unit 5 Record of Decision, Table 9-4
[b]If there was more than one sample result per day (e.g., a duplicate sample), then only the maximum sample concentration was counted and compared to the FRL.
[c]Rejected data qualified with either an R or Z were not used in this comparison.
[d]ND = not detected
[e]LCS = leachate collection system; LDS = leak detection system; HTW = horizontal till well
[f]NA = not applicable



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STATE PLANAR COORDINATE SYSTEM 1983

31-OCT-2003

FIGURE 3-1. ON-SITE DISPOSAL FACILITY FOOTPRINT AND MONITORING WELL LOCATIONS

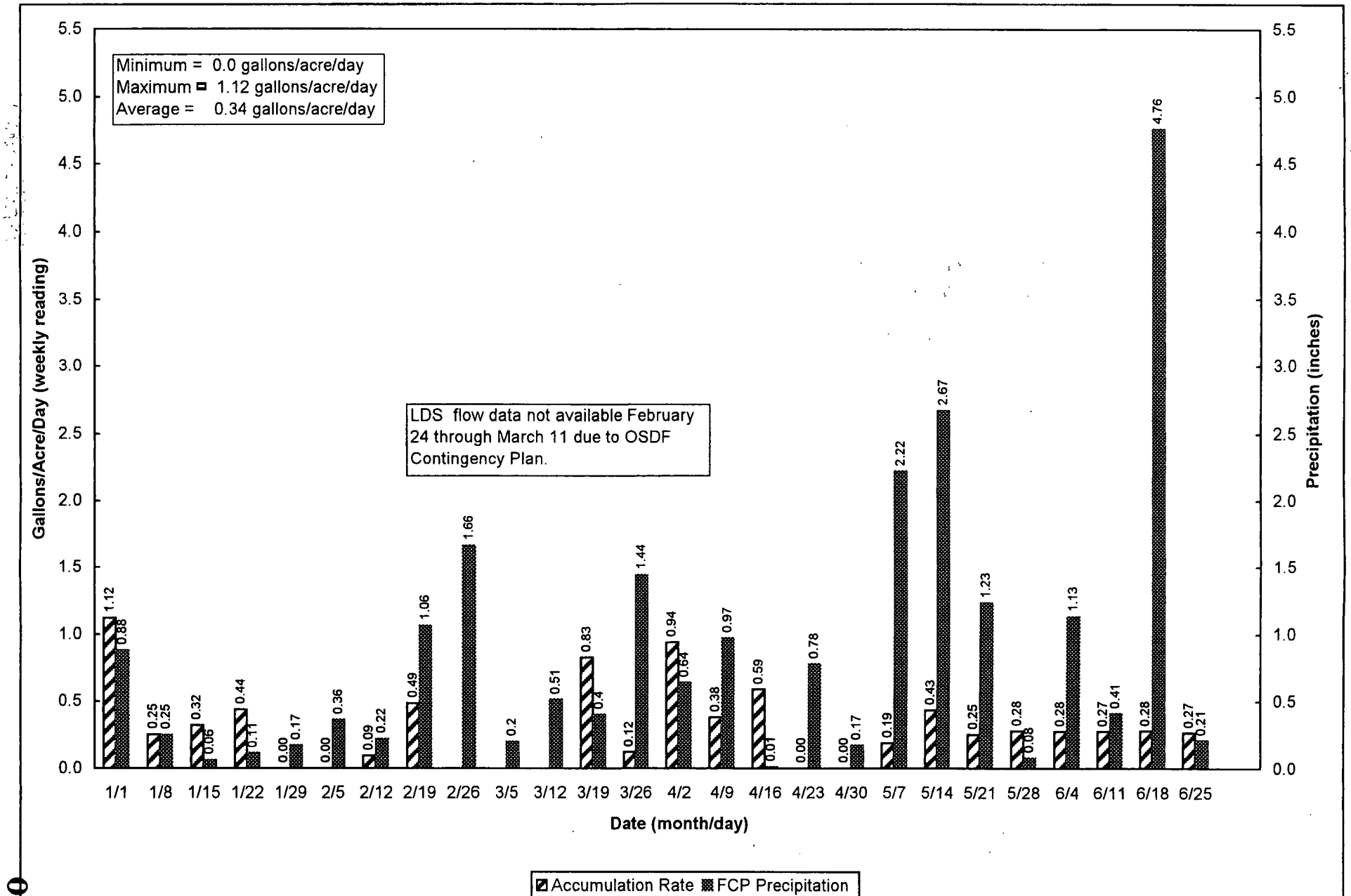

FIGURE 3-2. JANUARY 2003 THROUGH JUNE 2003 ON-SITE DISPOSAL FACILITY
LDS ACCUMULATION RATES FOR CELL 1

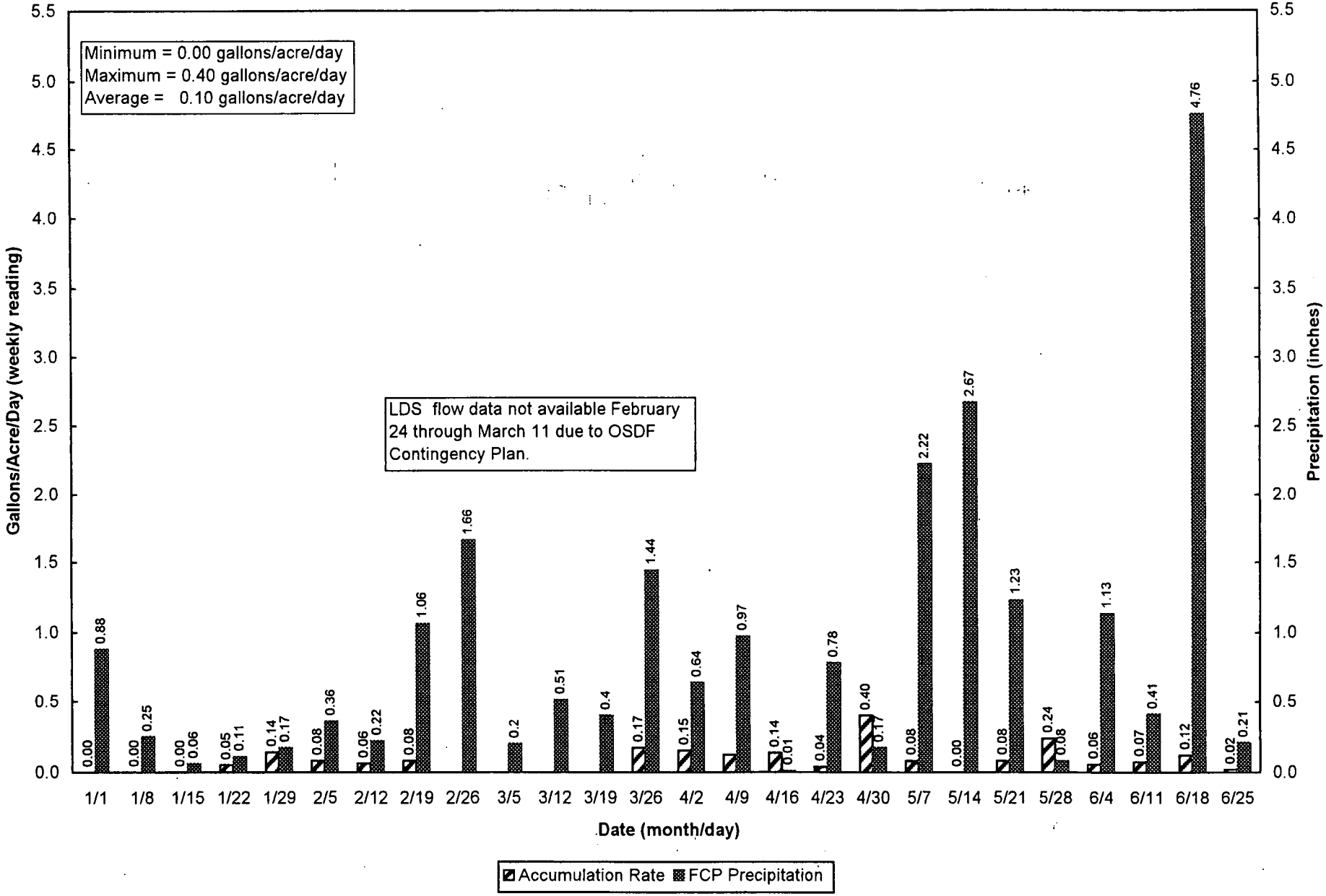

FIGURE 3-3 . JANUARY 2003 THROUGH JUNE 2003 ON-SITE DISPOSAL FACILITY
LDS ACCUMULATION RATES FOR CELL 2

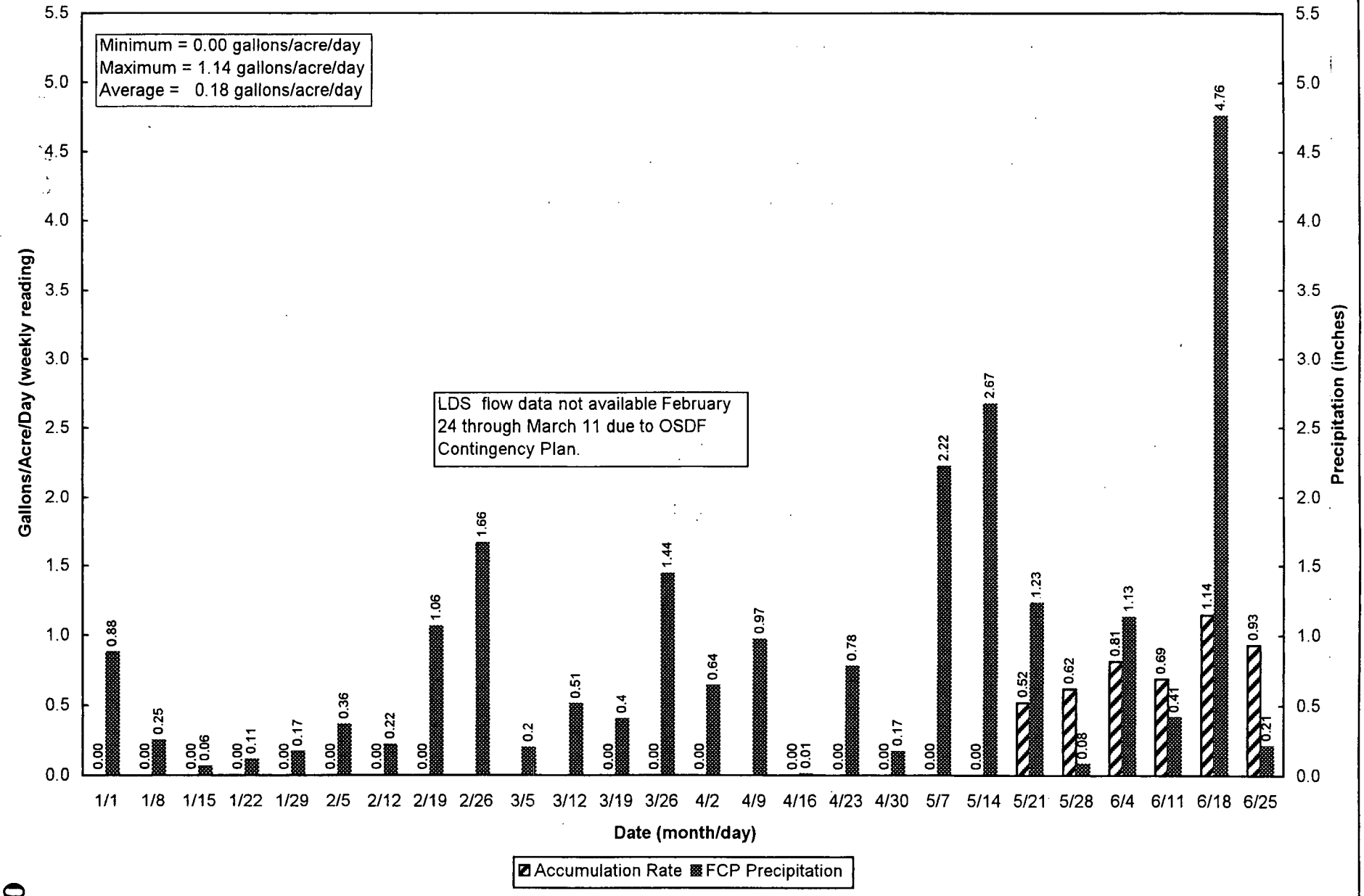

FIGURE 3-4. JANUARY 2003 THROUGH JUNE 2003 ON-SITE DISPOSAL FACILITY
LDS ACCUMULATION RATES FOR CELL 3

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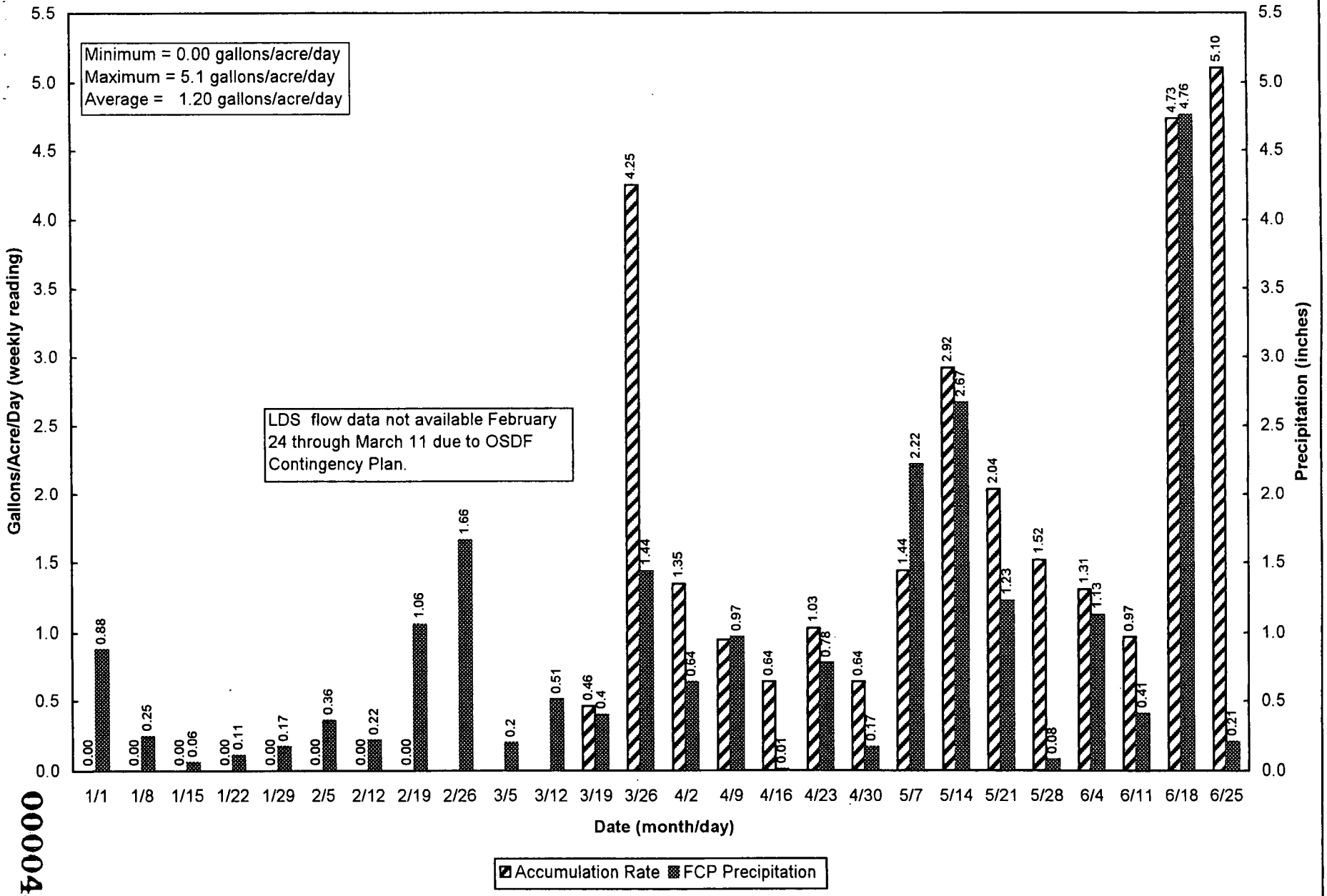


FIGURE 3-5. JANUARY 2003 THROUGH JUNE 2003 ON-SITE DISPOSAL FACILITY
LDS ACCUMULATION RATES FOR CELL 4

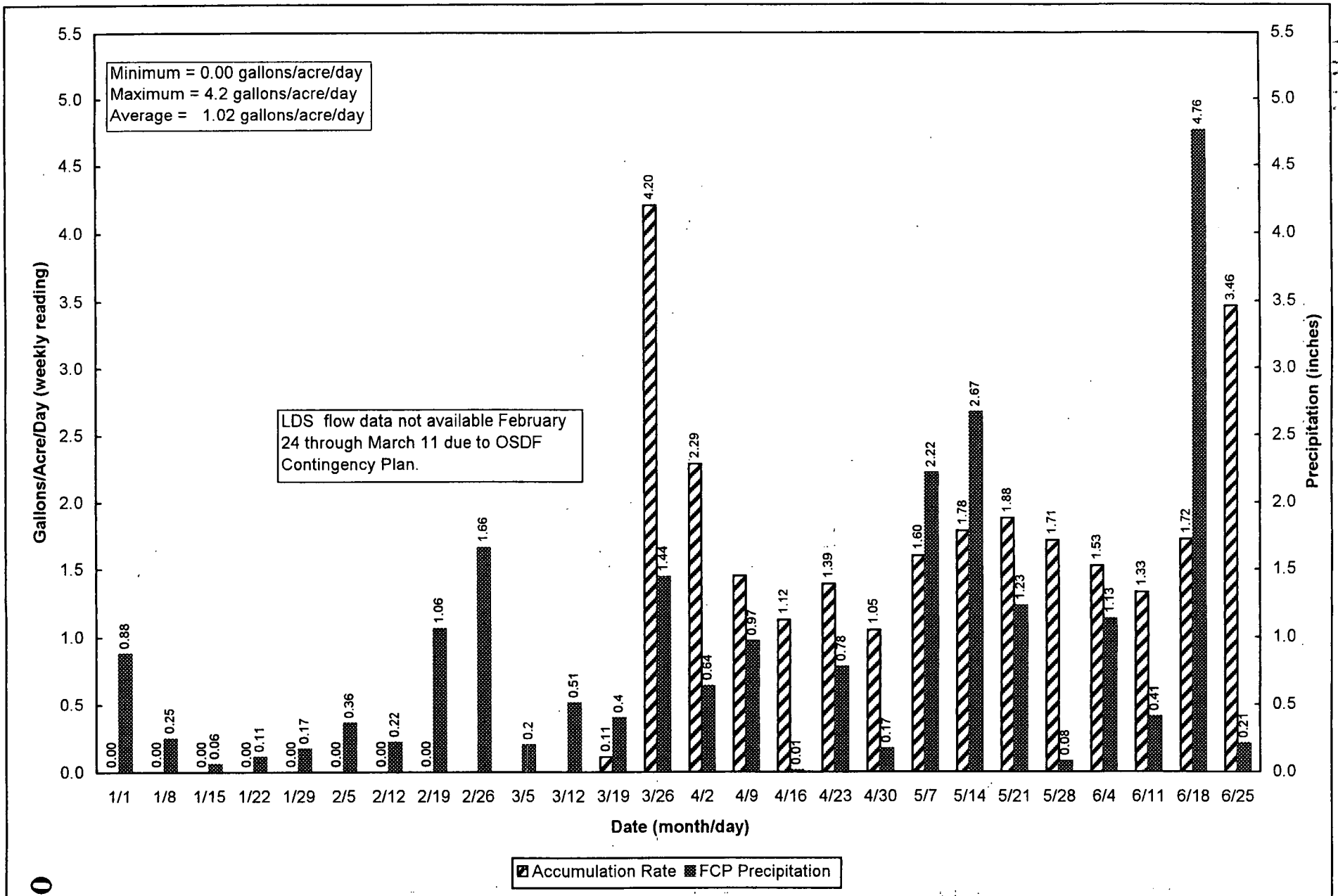
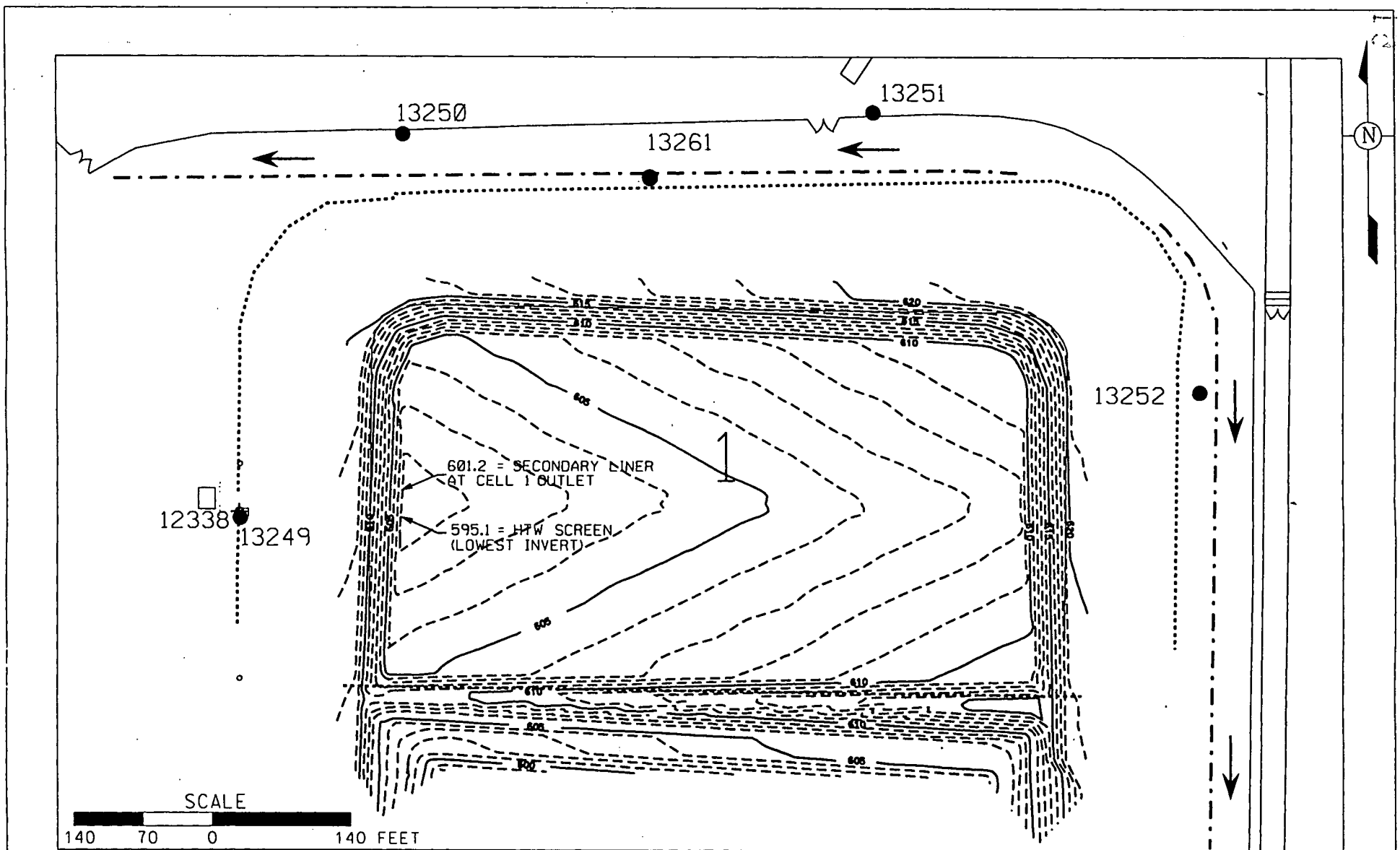


FIGURE 3-6. JANUARY 2003 THROUGH JUNE 2003 ON-SITE DISPOSAL FACILITY
LDS ACCUMULATION RATES FOR CELL 5



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STATE PLANAR COORDINATE SYSTEM 1983

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FIGURE 3-7. OSDF CELL 1 PERCHED WATER WELLS

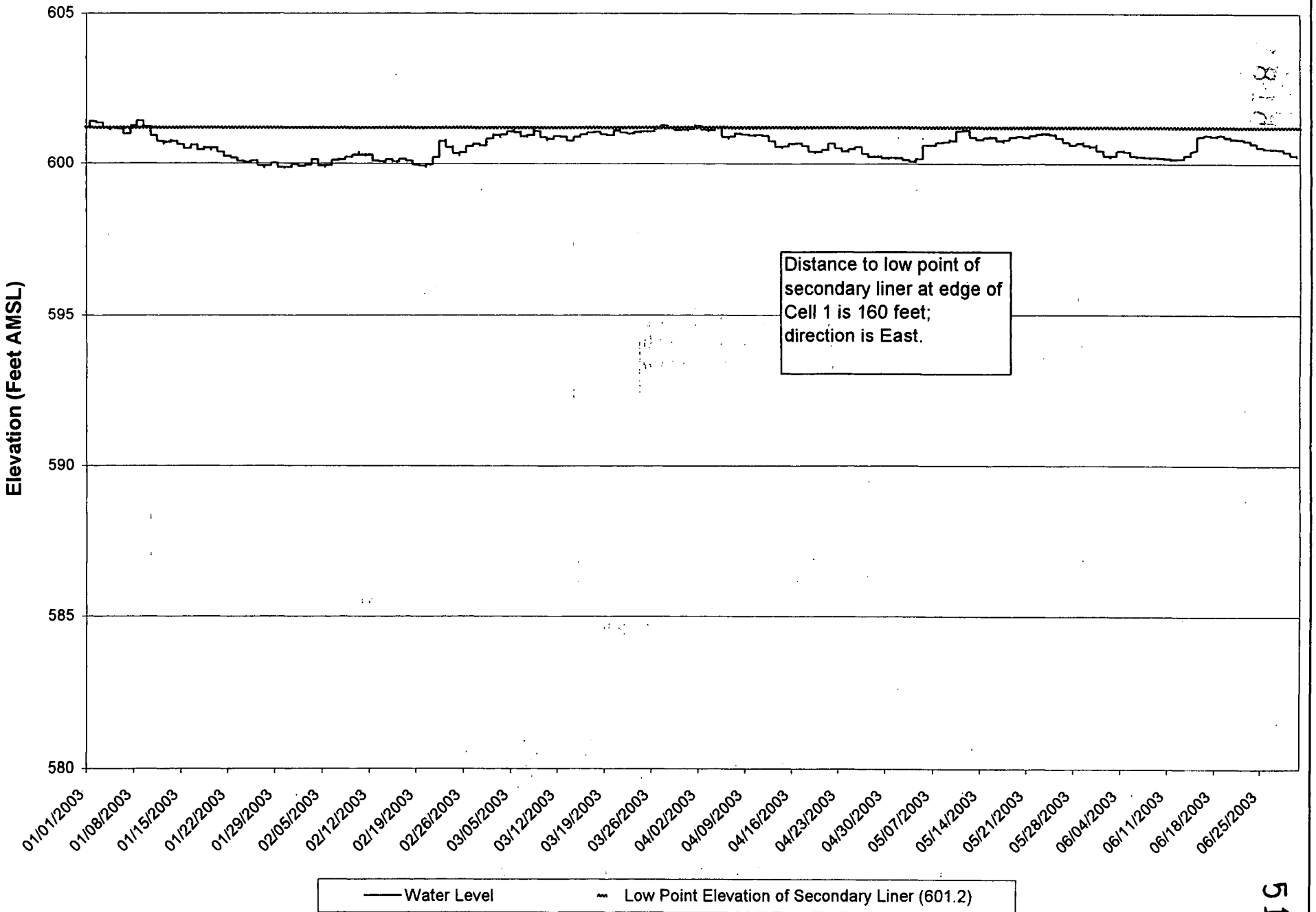

FIGURE 3-8. CELL 1 MONITORING WELL 13249 WATER LEVELS, JANUARY 1, 2003 THROUGH JUNE 30, 2003

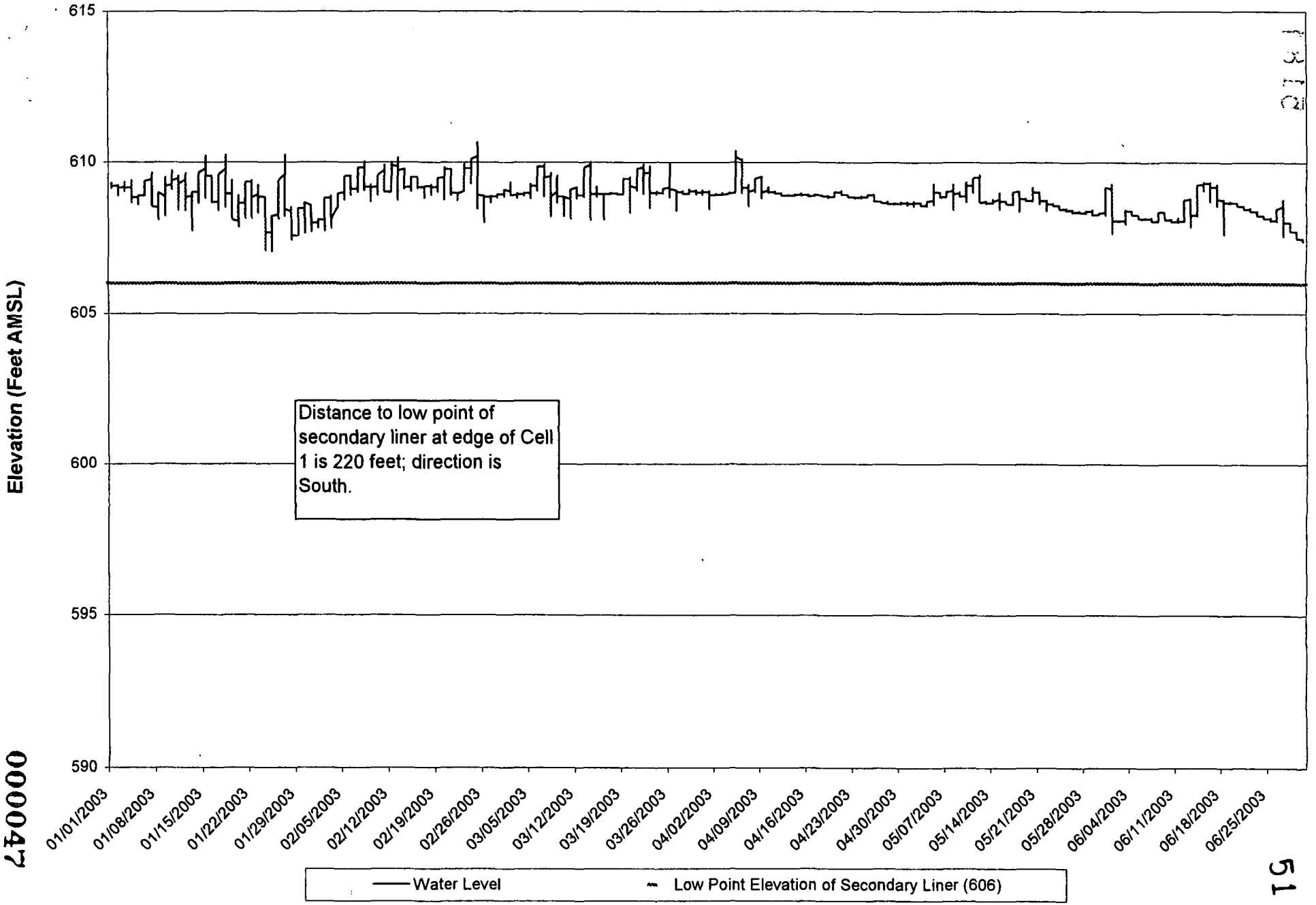

FIGURE 3-9. CELL 1 MONITORING WELL 13250 WATER LEVELS, JANUARY 1, 2003 THROUGH JUNE 30, 2003

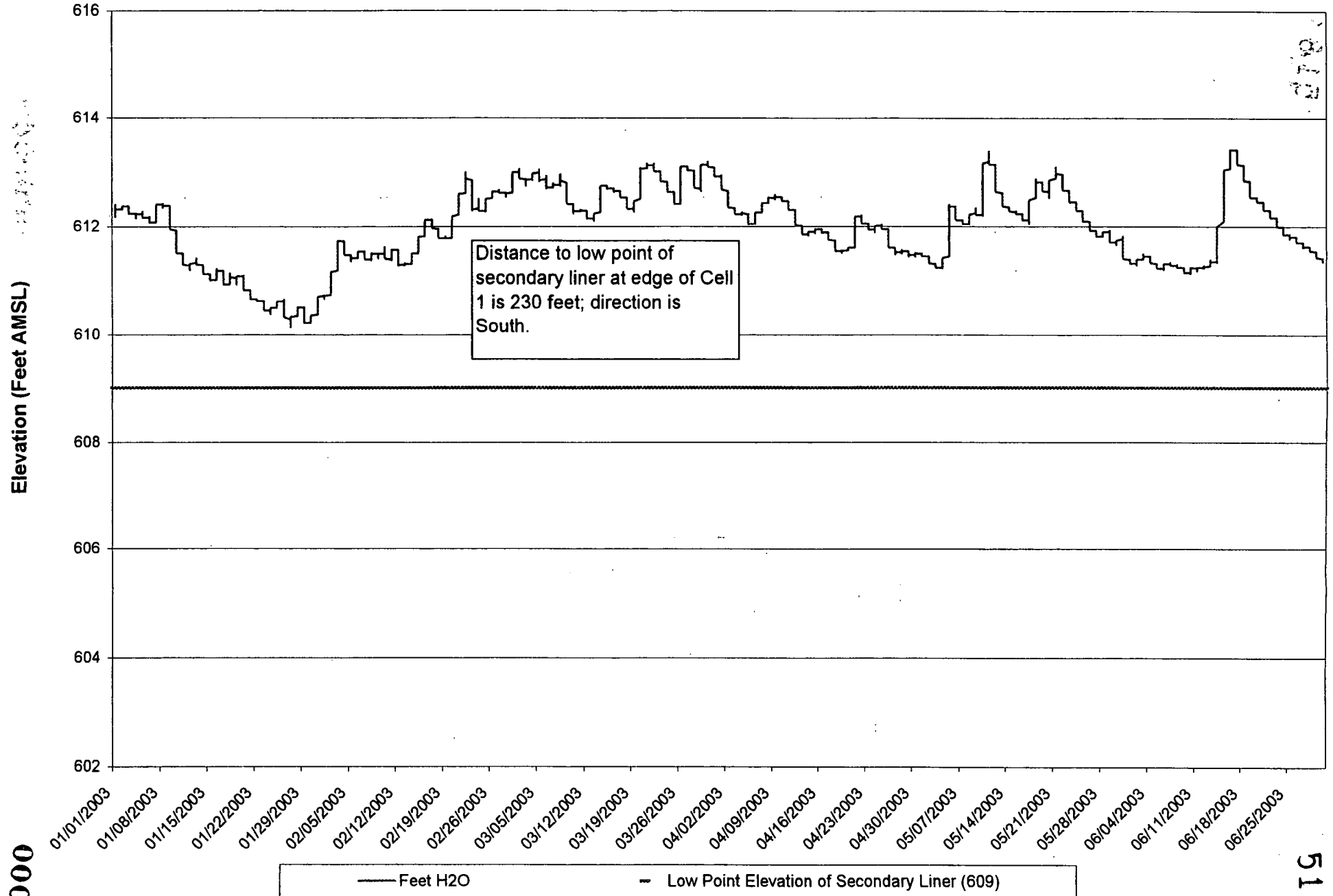

FIGURE 3-10. CELL 1 MONITORING WELL 13251 WATER LEVELS, JANUARY 1, 2003 THROUGH JUNE 30, 2003

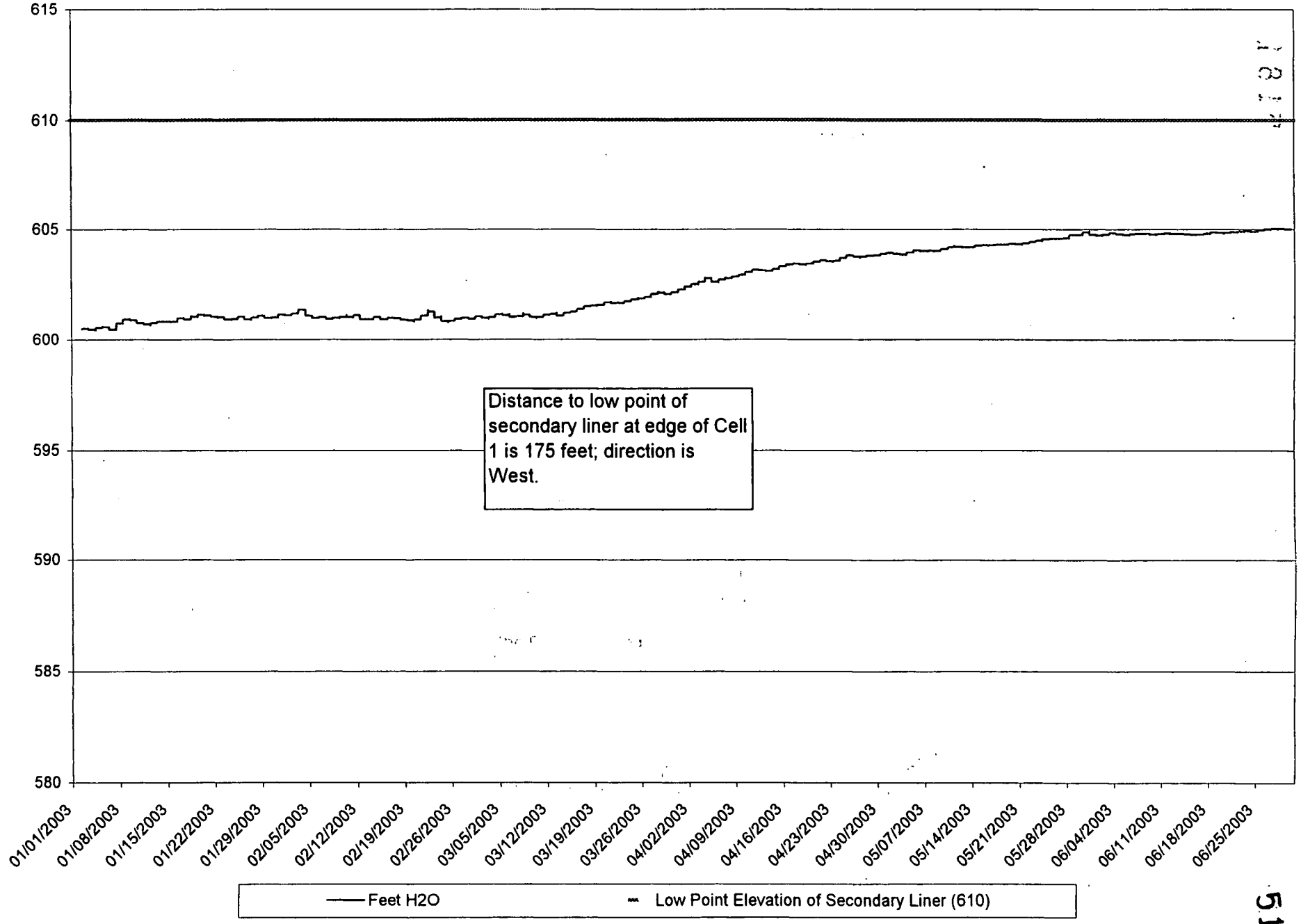

FIGURE 3-11. CELL 1 MONITORING WELL 13252 WATER LEVELS, JANUARY 1, 2003 THROUGH JUNE 30, 2003

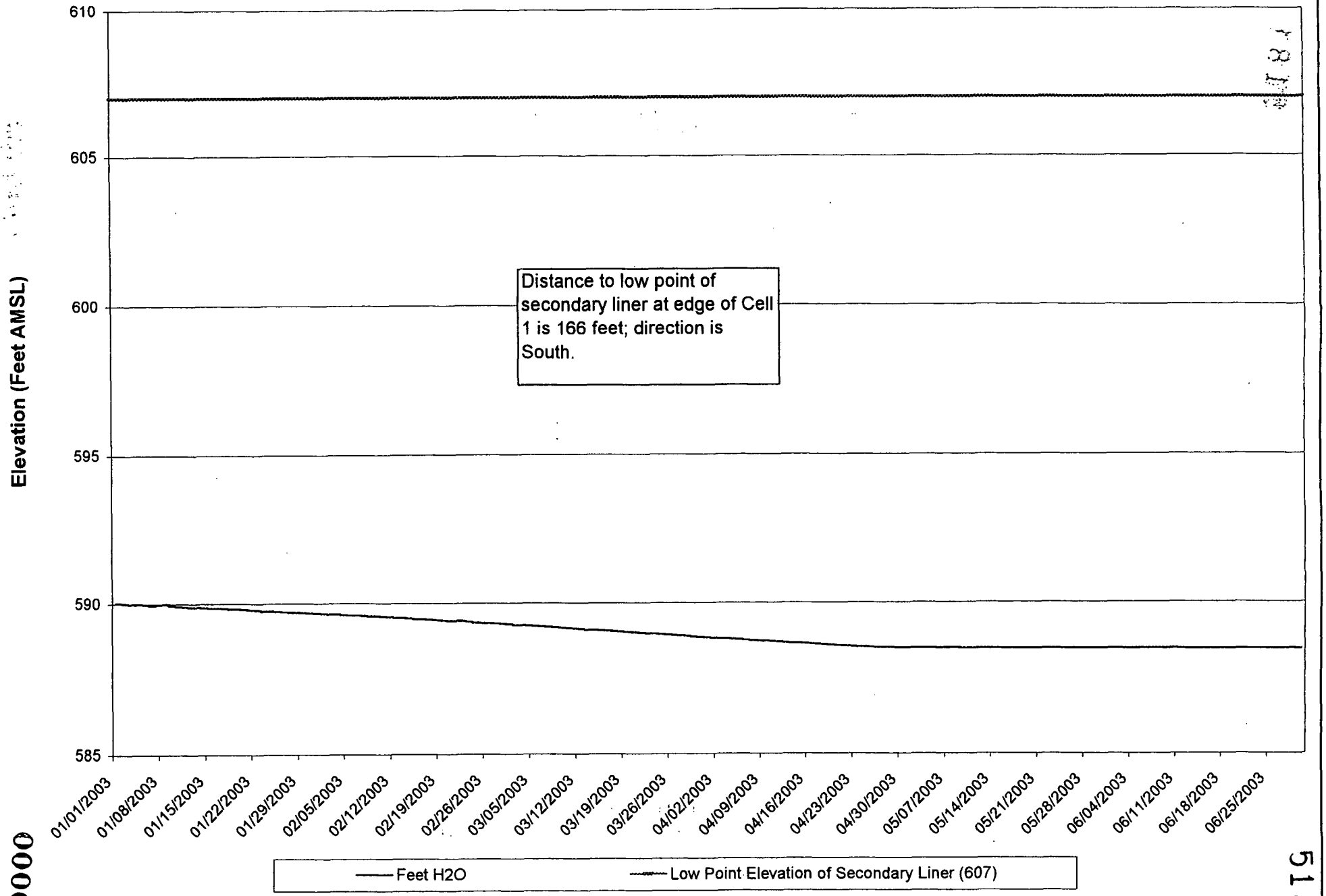

FIGURE 3-12. CELL 1 MONITORING WELL 13261 WATER LEVELS, JANUARY 1, 2003 THROUGH JUNE 30, 2003

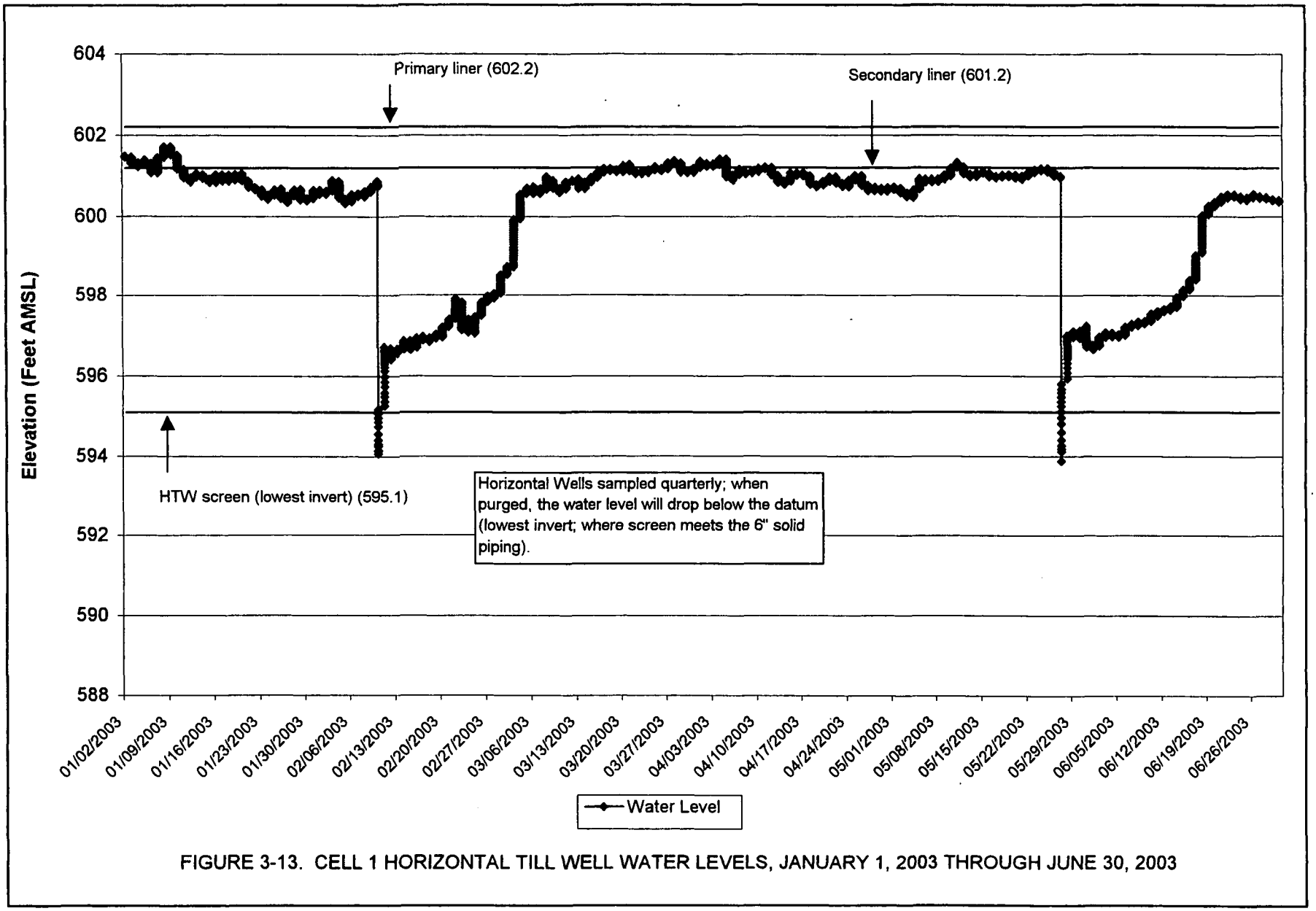

FIGURE 3-13. CELL 1 HORIZONTAL TILL WELL WATER LEVELS, JANUARY 1, 2003 THROUGH JUNE 30, 2003

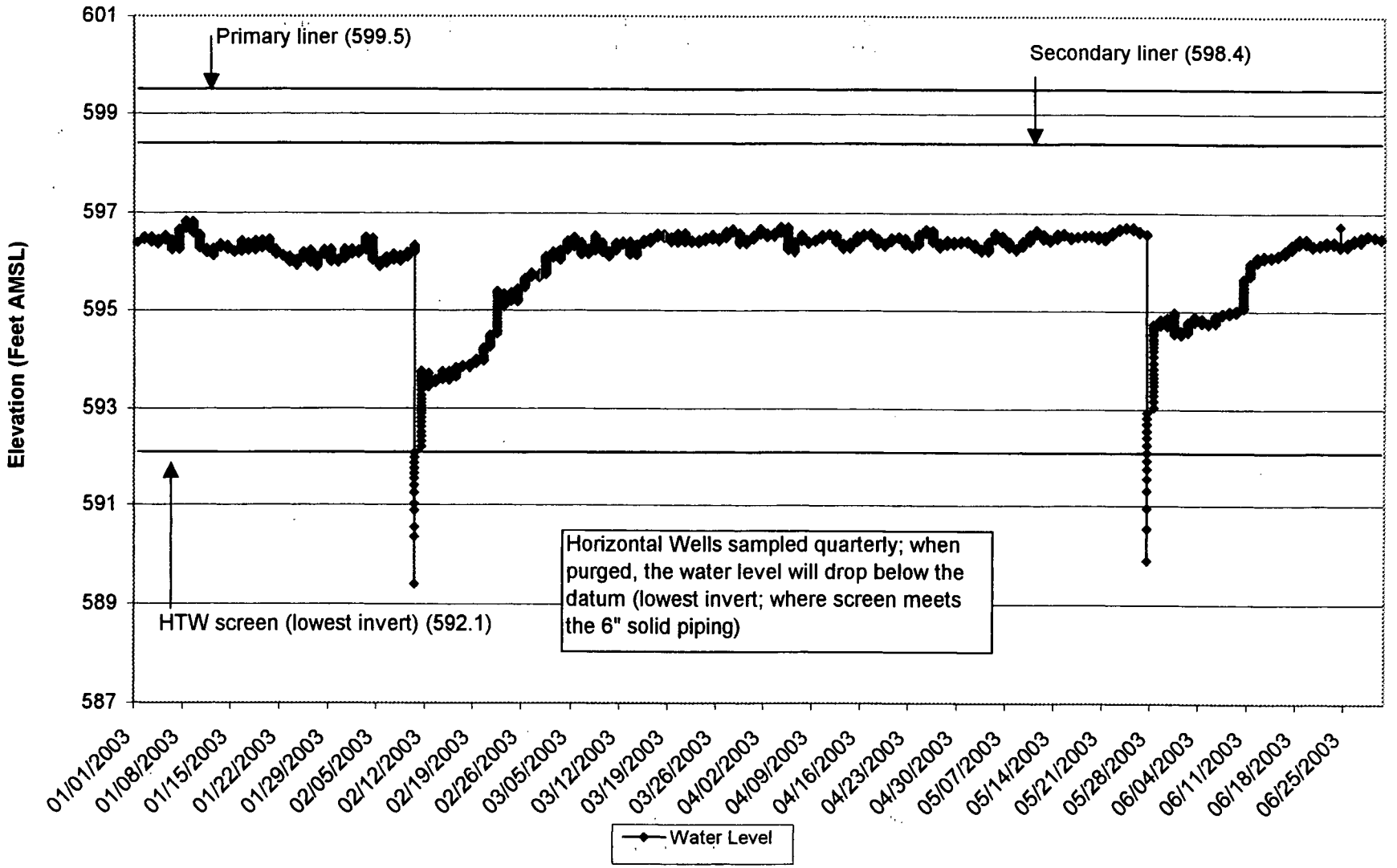

FIGURE 3-14. CELL 2 HORIZONTAL TILL WELL WATER LEVELS, JANUARY 1, 2003 THROUGH JUNE 30, 2003

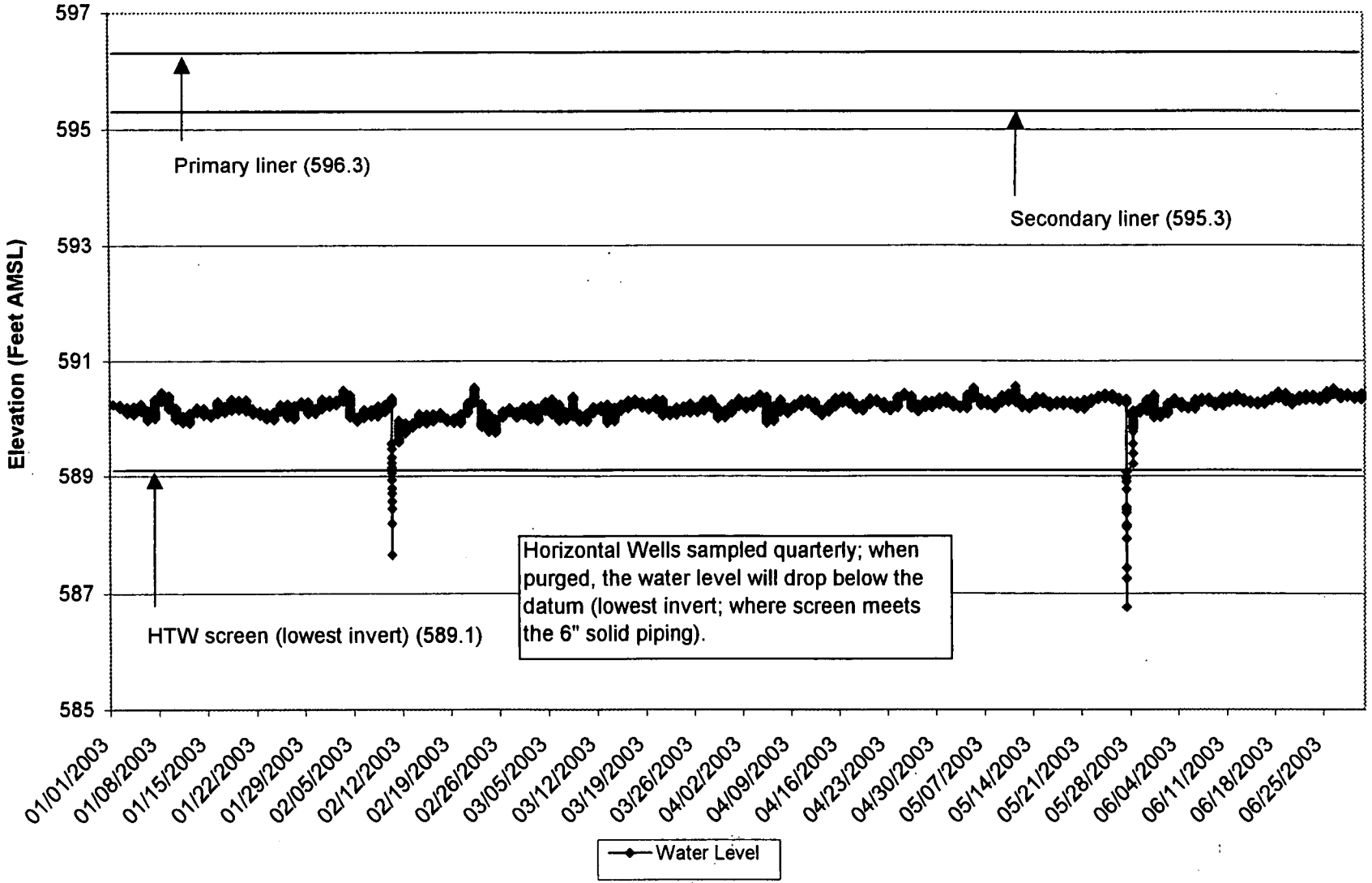

FIGURE 3-15. CELL 3 HORIZONTAL TILL WELL WATER LEVELS, JANUARY 1, 2003 THROUGH JUNE 30, 2003

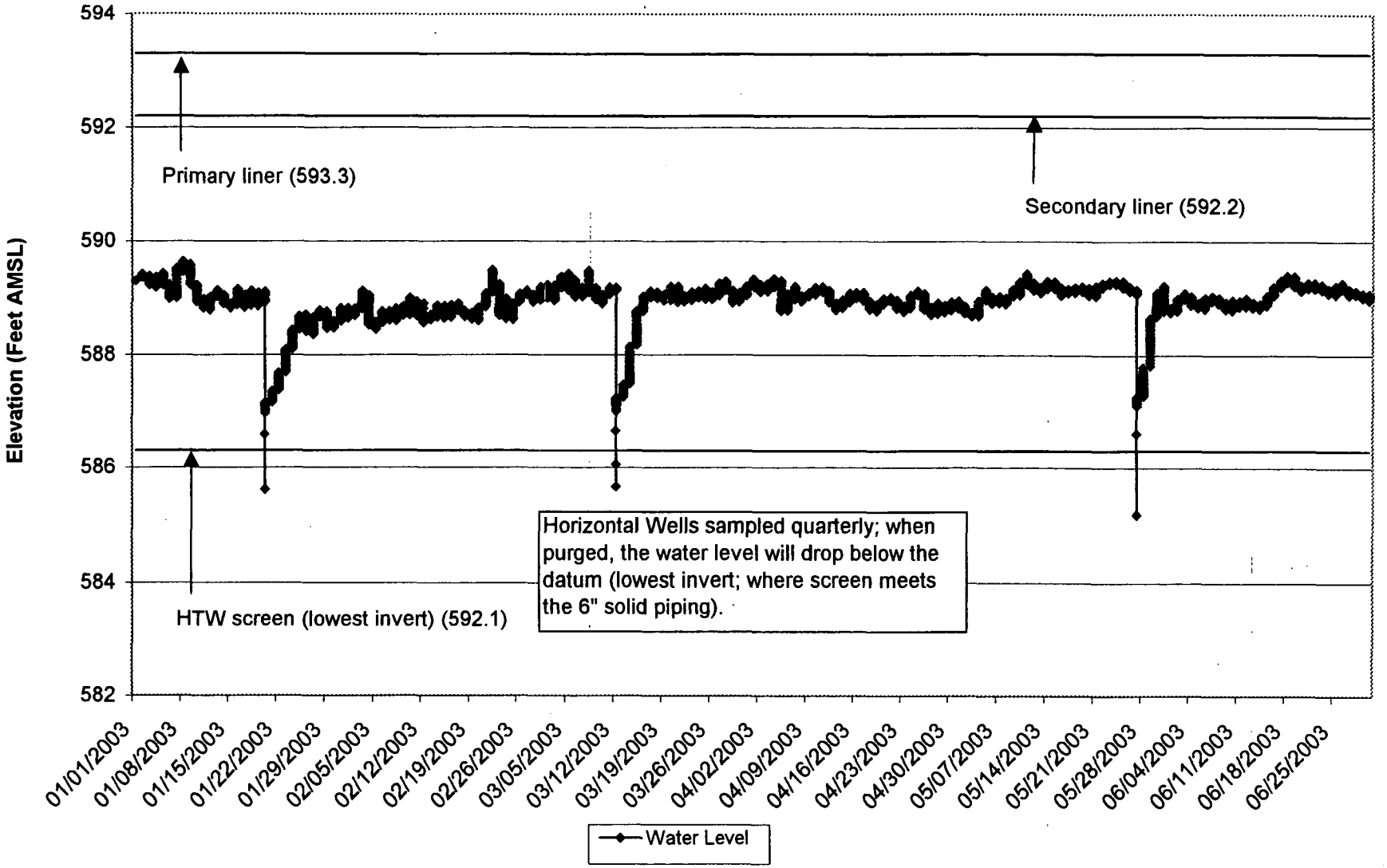

FIGURE 3-16. CELL 4 HORIZONTAL TILL WELL WATER LEVELS, JANUARY 1, 2003 THROUGH JUNE 30, 2003

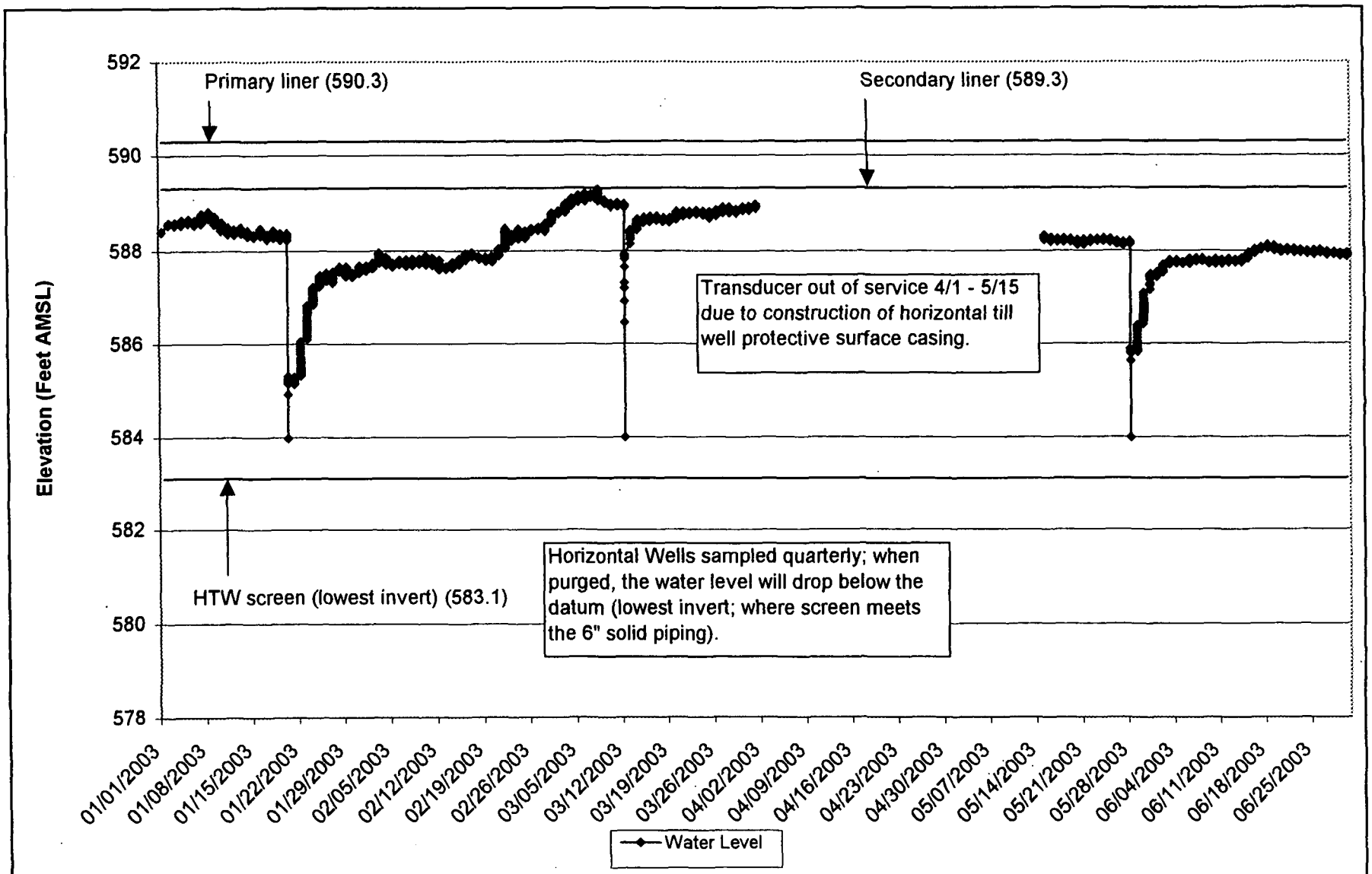

FIGURE 3-17. CELL 5 HORIZONTAL TILL WELL WATER LEVELS, JANUARY 1, 2003 THROUGH JUNE 30, 2003

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4. 0 SURFACE WATER MONITORING DATA

4.1 DATA COVERED

This IEMP mid-year data summary covers all surface water monitoring data collected under the IEMP program from January 1, 2003 through June 30, 2003. Specifically, this includes:

- National Pollutant Discharge Elimination System (NPDES) data
- Federal Facilities Compliance Agreement (FFCA)/Operable Unit 5 Record of Decision data
- IEMP characterization monitoring data.

All of these data sets are complete in accordance with sampling requirements identified in the IEMP, Revision 3.

4.2 NOTABLE RESULTS AND EVENTS

Notable results and events are those that impact, or could potentially impact, the scope of IEMP monitoring or remediation operations at the FCP. Notable results and events associated with the surface water monitoring program data identified above are as follows:

- NPDES Permit noncompliances: Fifteen NPDES noncompliances occurred and were reported to OEPA, as required, during the period under evaluation. The data for these noncompliances are as follows:

Date	Location	Parameter	Limit	Result
1/26/03	PF 4001	Oil and Grease	105 kg/d	237.37 kg/d
2/6/03	STP 4601	Total Suspended Solids	40 mg/L	146 mg/L
2/11/03	STP 4601	Total Suspended Solids	40 mg/L	142 mg/L
2/14/03	STP 4601	Total Suspended Solids	40 mg/L	76 mg/L
2/17/03	STP 4601	Total Suspended Solids	40 mg/L	52 mg/L
February 2003	STP 4601	Total Suspended Solids (Avg.)	20 mg/L	64.5 mg/L
3/17/03	PF 4001	Oil and Grease	10 mg/L	10.6 mg/L
3/17/03	PF 4001	Oil and Grease	105 kg/d	208.8 kg/d
March 2003	STP 4601	Total Suspended Solids (Avg.)	20 mg/L	27 mg/L
4/23/03	PF 4001	Oil and Grease	10 mg/L	12.8 mg/L
4/23/03	PF 4001	Oil and Grease	105 kg/d	276.1 kg/d
6/11/03	STP 4601	Fecal coliform	2000 #/100ml	31,875
6/15/03	SWRB 4002O	Total Suspended Solids	50 mg/L	112 mg/L
6/24/03	PF 4001	Oil and Grease	105 kg/d	164.2 kg/d
June	STP 4601	Total Suspended Solids	20 mg/L	20.65 mg/L

- FFCA/Operable Unit 5 Record of Decision compliance: The monthly average total uranium concentration of 30 µg/L for discharge to the Great Miami River was met every month in the reporting period. The monthly average for May of 20.9 µg/L was achieved by accounting for 11 maintenance bypass days. The monthly average for June of 17.6 µg/L was achieved by accounting for three maintenance bypass days and four storm water bypass days that occurred during the storm water bypass event on June 14 through June 18, 2003.

  The FCP is on track in complying with the 600-pounds-per-year limit of uranium discharged to the Great Miami River. At the end of June 2003, the total mass of uranium discharged was 256.02 pounds.

- IEMP FRL/benchmark toxicity value (BTV) exceedances: For the first half of 2003, there were no BTV or FRL exceedances attributable to the FCP; however, the following items are noteworthy:

  - A BTV exceedance at the Parshall Flume (PF 4001) for cadmium occurred on April 16, 2003. The measured concentration at PF 4001 was 0.00679 mg/L. After applying the mixing equation, the cadmium concentration in the river was 0.00977 mg/L, which exceeds the BTV of 0.0035 mg/L. This exceedance is the result of using the cadmium background concentration of 0.0098 mg/L in the mixing equation.

  - There was a mercury concentration of 0.000214 mg/L at location SWP-01 exceeding the mercury FRL of 0.0002 mg/L. SWP-01 is a background location and is not under the influence of FCP drainages; therefore, this exceedance is not related to FCP activities.

- The renewed NPDES Permit, 1IO00004*GD, was received from OEPA on June 11, 2003, and became effective in July 2003. New monitoring requirements and effluent limits have been incorporated into the new permit and were identified in the 2003 annual review of the IEMP transmitted to the EPA and OEPA in October 2003. In addition, a revised 7-day, 10-year low flow was established through the NPDES permitting process. The new low flow of 706 cubic feet per second (cfs) will be used in future evaluations involving the use of the mixing equation replacing the old low flow of 583 cfs.

A thorough review of the surface water monitoring data covered in this mid-year data summary was conducted to identify the notable results and events. Supplementary figures are provided here in support of the findings listed above. Figure 4-1 shows pounds of uranium discharged to the Great Miami River from the Parshall Flume. Figure 4-2 shows the monthly average total uranium concentrations in water discharged from the Parshall Flume. All data covered by this mid-year data summary are available on the IEMP Data Information Site. Maps of NPDES and surface water sample locations are also provided on the IEMP Data Information Site.

Additionally, note that the uranium loading term (currently 2.6 pounds of uranium/inch of rainfall) is being re-evaluated and will be provided to the agencies in the near future. As identified when the loading term was revised to 2.6 (provided in the 1999 IEMP Revision 1 Annual Review), it is appropriate to re-evaluate this term as remediation progresses and site conditions affecting the quantity and/or quality of uncontrolled runoff are documented.

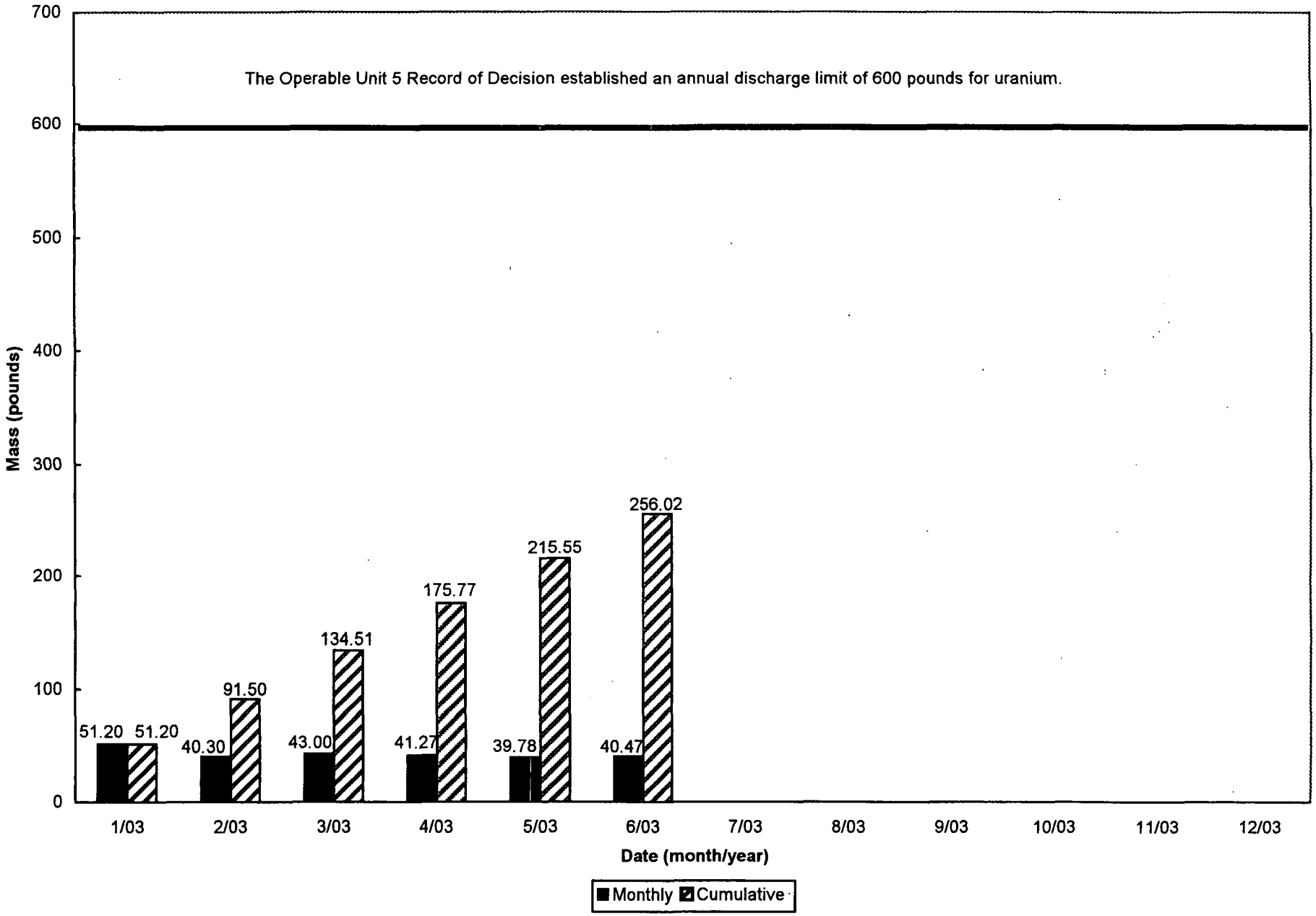
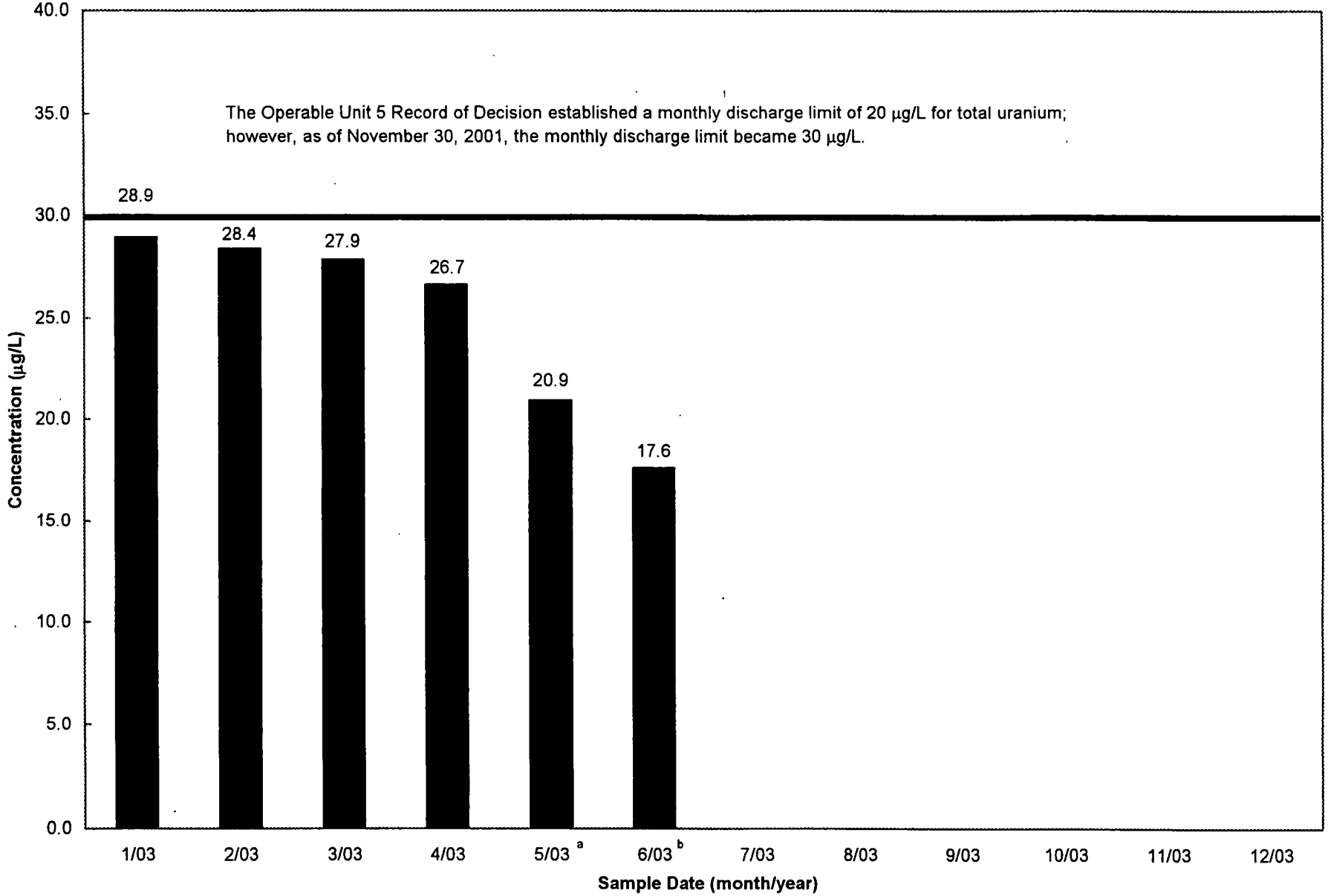


FIGURE 4-1. POUNDS OF URANIUM DISCHARGED TO THE GREAT MIAMI RIVER FROM THE PARSHALL FLUME (PF 4001) IN JANUARY 2003 THROUGH JUNE 2003



[a]The monthly average for May of 20.9 µg/L was achieved by accounting for eleven maintenance bypass days.

[b]The monthly average for June of 17.6 µg/L was achieved by accounting for three maintenance bypass days and four storm water bypass days that occurred during the storm water bypass event on June 14 through June 18, 2003.

FIGURE 4-2. JANUARY 2003 THROUGH JUNE 2003 MONTHLY AVERAGE TOTAL URANIUM CONCENTRATION IN WATER DISCHARGED FROM THE PARSHALL FLUME (PF 4001) TO THE GREAT MIAMI RIVER

5. 0 AIR MONITORING DATA

5.1 DATA COVERED

This IEMP mid-year data summary covers all air monitoring data collected under the IEMP program from January 1, 2003 through June 30, 2003. Specifically, this includes:

- Radiological air particulate monitoring results from biweekly samples covering the period of December 23, 2002 through June 24, 2003 (i.e., biweekly samples were actually collected January 7, 2003 through June 24, 2003). The biweekly sample results for the first half of 2003 are compiled in Tables 5-1 through 5-5 for the purpose of comparison to previous results.
- Radiological air particulate quarterly composite samples collected during the first half of 2003 for National Emissions Standards for Hazardous Air Pollutants (NESHAP) compliance purposes
- NESHAP stack emissions monitoring samples collected during the first half of 2003
- Environmental radon monitoring data collected during the first half of 2003
- Silos headspace radon concentrations data collected during the first half of 2003
- Direct radiation (thermoluminescent dosimeter [TLD]) monitoring data collected during the first half of 2003.

All of the data sets for the aforementioned programs are complete in accordance with sampling requirements identified in the IEMP, Revision 3.

5.2 NOTABLE RESULTS AND EVENTS

Notable results and events are those that impact, or could potentially impact, the environmental pathways under the scope of IEMP monitoring at the FCP. Notable results and events associated with IEMP air monitoring data for the time period covered by this mid-year data summary include the following:

Biweekly Air Particulate Results

- Figures 5-1 through 5-3 illustrate that there was a relative increase in uranium concentrations at the site fenceline during the period from mid-April 2003 through June 2003 when compared to biweekly data reported in the second half of 2002. Per the data evaluation criteria of the IEMP, the impact of the higher concentrations was evaluated with respect to the NESHAP annual limit of 10 millirem (mrem)/year. The estimated dose from the increase in uranium concentrations was less than one millirem. The higher uranium concentrations are attributed to fugitive emissions from the decontamination and dismantlement of buildings, emissions from the excavation of building foundations and handling of contaminated soil, and fugitive emissions from the Waste Pits Project (WPP).
- Figures 5-4 through 5-6 illustrate that thorium-230 concentrations at the site fenceline during the first half of 2003 were comparable to the biweekly data from the second half of 2002. The pugmill ventilation system (which began operating in April 2002) has been effective in controlling fugitive emissions from pugmill operations and limiting thorium-230 levels at the fenceline monitors even though the rate of waste processing has increased. The January 2003 data gaps in Figures 5-4 through 5-6 are due to the loss of January composite results. Sample handling errors at the offsite laboratory led to the loss of all January composite sample data. The contract laboratory addressed the problem and subsequent analyses have been satisfactory. The

March and June data gaps are due to changes in the IEMP fenceline thorium monitoring program. As described in revision 3 of the IEMP, the fenceline thorium monitoring program changed from biweekly to monthly analysis in 2003. During the third month of each calendar quarter (i.e., March, June, September, and December) the monthly thorium analysis is suspended and the quarterly composite analysis is used to monitor fenceline thorium.

NESHAP Quarterly Composite Air Data

- The maximum 2003 year-to-date (as of June) dose at the site fenceline air monitoring stations (AMS-22) was 0.46 mrem as summarized in Table 5-6 For comparison, the maximum mid-year dose in 2002 was 0.44 mrem. On average, thorium isotopes contributed approximately 40 percent of the year-to-date dose measured at all fenceline air monitors. In particular, thorium-230 contributed an average of 23 percent of the dose, while uranium and radium-226 contributed an average of approximately 39 and 20 percent, respectively.

Direct Radiation Results

- Prior to the continuous operation of the Radon Control System (RCS), direct radiation TLD measurements indicated a generally upward trend in the immediate area of the K-65 Silos (locations 22 through 26) and, to a lesser extent, at the site fenceline nearest the K-65 Silos (location 6). Following the start up of the RCS in May 2003, there was a significant decrease in direct radiation levels in the vicinity of the K-65 Silos and at the western fenceline of the site. The decrease in direct radiation levels is related to the decrease in headspace radon concentration from the operation of the RCS. Figures 5-7 and 5-8 illustrate the decrease in direct radiation measurements in the vicinity of the K-65 Silos and at location 6 during the first half of 2003, respectively.

Radon Monitoring Results

- During the first quarter of 2003, the silo headspace radon concentrations (refer to Figure 5-9) were comparable to concentrations measured during 2002. During the second quarter of 2003, and more specifically since May, the silo headspace radon concentrations sharply decreased due the operation of the RCS. Continuous operation of the RCS has maintained the average silo headspace radon concentration at levels below one million picoCuries per liter (pCi/L) since May 2003.

- During the period of January 2003 through June 2003, there were no exceedance events of the 100 pCi/L radon limit in the Silos exclusion area. For comparison, there were seven exceedance events during the January 2002 through June 2002 time period. Exceedance events are defined as a period of time during which the hourly average radon concentration exceeds the DOE Order 5400.5 100-pCi/L limit. The decrease in the number of exceedance events is the product of favorable meteorological conditions (i.e., infrequent or relatively weak atmospheric inversions) during the first quarter of 2003 and the operation of the RCS during the second quarter of 2003. The operation of the RCS also limits the release of radon from the silos to the area immediately around the silos. The effect of RCS operations on environmental radon levels is illustrated in Figure 5-10. The operation of the RCS led to a decrease in the monthly average radon concentrations for May and June at the exclusion fence monitors (KNE, KNW, KSE, and KSW) in comparison to concentrations measured during the same time period in 2002 (refer to Figure 5-10).

NESHAP Stack Emissions Results

- The mid-year summary NESHAP stack emission results for Building 71, WPP Dryer Stack, WPP Pugmill Stack, and the Silos RCS Stack are presented in Table 5-9. Waste packaging operations in Building 71 were completed in late June 2003. The Building 71 stack was taken out of operation in July. An increase in source operations for the RCS Stack occurred with the start of continuous operations in May 2003.

A thorough review of the air monitoring data covered by this mid-year data summary was conducted to identify the notable results. Supplementary tables and figures are also provided in support of the information above. Tables 5-1 through 5-5 summarize the biweekly total uranium, total particulate, and isotopic thorium concentrations from January through June of 2003. Tables 5-1 through 5-5 also include 2002 annual summary results and 1990 through 2002 summary results. Table 5-6 contains the 2003 year-to-date doses for each air monitoring station and the fractional contribution of each radionuclide to the total dose. Table 5-7 summarizes the environmental radon data from continuous monitors from January through June 2003 and the annual summary results for 2002. Table 5-8 provides the direct radiation measurements from the first and second quarter 2003 and the annual summary results for 2002. Table 5-9 contains the NESHAP stack results from the first half of 2003 and the annual summary results for 2002. All data covered by this mid-year data summary are available on the IEMP Data Information Site, as well as, maps showing the locations of monitoring stations.

TABLE 5-1

TOTAL URANIUM PARTICULATE CONCENTRATIONS IN AIR FROM BIWEEKLY SAMPLES

	Mid-Year 2003 Results (January - June) (pCi/m^3 x 1E-6)				2002 Annual Summary Results[a] (pCi/m^3 x 1E-6)				1990 through 2002 Summary Results[a] (pCi/m^3 x 1E-6)	
	No. of Samples	Min.	Max.	Avg.	No. of Samples	Min.	Max.	Avg.	Min.	Max.
Fenceline										
AMS-2	13	4.7	609	144	26	21	270	114	0.0	3500
AMS-3	13	8.8	637	218	26	27	1499	236	0.0	17000
AMS-4	13	3.4	181	56	26	12	278	58	0.0	2300
AMS-5	13	3.3	147	62	26	2.7	191	45	0.0	4400
AMS-6	13	8.3	723	238	26	14	823	133	0.0	3200
AMS-7	13	4.8	421	106	26	5.0	209	50	0.0	7800
AMS-8A	13	4.6	414	187	26	13	1862	260	0.0	1862
AMS-9C[b]	13	6.2	780	278	26	39	1712	255	0.0	1712
AMS-22	13	19	1622	286	26	18	276	115	0.0	276
AMS-23	13	14	692	169	26	0.0	226	92	0.0	226
AMS-24	13	15	139	52	26	0.0	114	37	0.0	207
AMS-25	13	6.8	73	37	26	0.0	95	31	0.0	402
AMS-26	13	13	1000	214	26	8.0	336	64	0.0	336
AMS-27	13	18	1348	198	26	12	300	63	0.0	300
AMS-28	13	13	943	293	26	21	924	130	0.0	924
AMS-29	13	9.0	1888	211	26	9.7	325	76	0.0	326
Background										
AMS-12	13	3.2	40	15	26	0.0	38	15	0.0	480

[a]For blank corrected concentrations less than or equal to 0.0 pCi/m^3, the concentration is set as 0.0 pCi/m^3.
[b]Summary results for 1990 through 2002 include AMS-9B/C data.

TABLE 5-2

TOTAL PARTICULATE CONCENTRATIONS IN AIR FROM BIWEEKLY SAMPLES

	Mid-Year 2003 Results (January-June) ($\mu g/m^3$)				2002 Annual Summary Results ($\mu g/m^3$)				1990 through 2002 Summary Results ($\mu g/m^3$)	
	No. of Samples	Min.	Max.	Avg.	No. of Samples	Min.	Max.	Avg.	Min.	Max.
Fenceline										
AMS-2	13	18	48	32	26	15	62	32	7.0	77
AMS-3	13	18	69	38	26	17	68	40	8.0	159
AMS-4	13	17	43	30	26	18	58	34	13	79
AMS-5	13	15	36	27	26	15	43	28	9.6	62
AMS-6	13	18	62	34	26	13	51	31	8.0	69
AMS-7	13	16	46	31	26	15	44	30	6.8	84
AMS-8A	13	8.6	49	33	26	18	53	33	13	89
AMS-9C[a]	13	25	65	40	26	20	94	49	7.1	136
AMS-22	13	21	45	31	26	18	48	31	13	57
AMS-23	13	15	51	30	26	14	51	29	11	57
AMS-24	13	15	114	42	26	19	61	37	5.4	79
AMS-25	13	11	35	24	26	13	49	31	13	69
AMS-26	13	17	124	40	26	16	42	29	15	52
AMS-27	13	28	61	45	26	26	76	52	16	92
AMS-28	13	15	33	24	26	13	58	27	12	68
AMS-29	13	15	91	36	26	16	72	36	11	72
Background										
AMS-12[b]	13	14	37	25	26	14	44	27	6.0	416
Project-Specific										
WPTH-2[c]	13	19	44	35	26	21	49	34	21	77

[a]Summary results for 1990 through 2002 include AMS-9B/C data.
[b]Total particulate analysis was discontinued during 1994 and was reinstated for AMS-12 in 1997.
[c]Monitor associated with the WPP.

TABLE 5-3

THORIUM-228 PARTICULATE CONCENTRATIONS IN AIR FROM MONTHLY SAMPLES

	Mid-Year 2003 Results (January-June) (pCi/m^3 x 1E-6)				2002 Annual Summary Results[a] (pCi/m^3 x 1E-6)				1990 through 2002 Summary Results[a] (pCi/m^3 x 1E-6)	
	No. of Samples	Min.	Max.	Avg.	No. of Samples	Min.	Max.	Avg.	Min.	Max.
Fenceline										
AMS-2	2	6.4	9.0	8	26	0.0	38	7.1	0.0	38
AMS-3	3	8.8	23	15	26	0.0	26	10	0.0	26
AMS-4	3	6.4	17	11	26	0.0	19	6.3	0.0	22
AMS-5	3	4.2	13	9.4	26	0.0	18	4.9	0.0	18
AMS-6	3	7.7	15	11	26	0.0	18	7.6	0.0	18
AMS-7	3	5.7	17	10	26	0.0	14	5.9	0.0	17
AMS-8A	3	3.4	15	11	26	0.0	23	8.6	0.0	39
AMS-9C[b]	3	7.3	35	21	26	0.0	50	15	0.0	50
AMS-22	3	8.1	15	11	26	0.0	18	6.9	0.0	30
AMS-23	2	4.8	8.8	6.8	26	0.0	18	5.8	0.0	22
AMS-24	3	4.9	12	10	26	0.0	27	10	0.0	27
AMS-25	2	4.5	5.5	5.0	26	0.0	17	5.5	0.0	17
AMS-26	2	4.3	17	10	26	0.0	15	6.0	0.0	24
AMS-27	2	6.6	16	11	26	0.0	22	8.2	0.0	22
AMS-28[c]	3	3.4	21	10	26	0.0	17	5.2	0.0	39
AMS-29	3	7.2	21	14	26	0.0	46	7.9	0.0	46
Background										
AMS-12	3	3.3	12	7.6	26	0.0	13	4.8	0.0	17
Project-Specific										
WPTH-2[d]	3	5.7	13	9.1	26	0.7	20	8.9	0.0	28

[a]For blank corrected concentrations less than or equal to 0.0 pCi/m^3, the concentration is set as 0.0 pCi/m^3.
[b]Summary results for 1990 through 2002 include AMS-9B/C data.
[c]AMS-28 includes WPTH-1 results.
[d]Monitor associated with the WPP.

TABLE 5-4

THORIUM-230 PARTICULATE CONCENTRATIONS IN AIR FROM MONTHLY SAMPLES

	Mid-Year 2003 Results (January-June) (pCi/m^3 x 1E-6)				2002 Annual Summary Results[a] (pCi/m^3 x 1E-6)				1990 through 2002 Summary Results[a] (pCi/m^3 x 1E-6)	
	No. of Samples	Min.	Max.	Avg.	No. of Samples	Min.	Max.	Avg.	Min.	Max.
Fenceline										
AMS-2	2	47	56	52	26	0.0	140	46	0.0	140
AMS-3	3	97	123	114	26	0.7	277	86	0.0	744
AMS-4	3	28	43	36	26	0.0	65	27	0.0	91
AMS-5	3	34	85	57	26	0.0	124	30	0.0	620
AMS-6	3	92	177	122	26	0.0	488	100	0.0	488
AMS-7	3	31	70	50	26	0.0	77	19	0.0	77
AMS-8A	3	48	121	79	26	0.0	248	74	0.0	461
AMS-9C[b]	3	67	133	93	26	5.8	316	94	3.2	407
AMS-22	3	63	182	103	26	8.4	289	101	0.37	493
AMS-23	2	56	59	57	26	8.6	210	58	0.0	210
AMS-24	3	15	48	33	26	0.4	76	28	0.0	125
AMS-25	2	10	17	14	26	0.0	84	23	0.0	223
AMS-26	2	56	141	98	26	0.0	231	47	0.0	233
AMS-27	2	26	74	50	26	0.6	189	42	0.0	189
AMS-28[c]	3	47	129	77	26	16	384	94	5.1	401
AMS-29	3	41	153	92	26	2.1	109	30	0.0	537
Background										
AMS-12	3	2.4	36	16	26	0.0	24	5.6	0.0	42
Project Specific										
WPTH-2[d]	3	57	201	120	26	0.0	580	152	0.0	580

[a]For blank corrected concentrations less than or equal to 0.0 pCi/m^3, the concentration is set as 0.0 pCi/m^3.
[b]Summary results for 1990 through 2002 include AMS-9B/C data.
[c]AMS-28 includes WPTH-1 results.
[d]Monitor associated with the WPP.

TABLE 5-5

THORIUM-232 PARTICULATE CONCENTRATIONS IN AIR FROM MONTHLY SAMPLES

	Mid-Year 2003 Results (January-June) (pCi/m^3 x 1E-6)				2002 Annual Summary Results[a] (pCi/m^3 x 1E-6)				1990 through 2002 Summary Results[a] (pCi/m^3 x 1E-6)	
	No. of Samples	Min.	Max.	Avg.	No. of Samples	Min.	Max.	Avg.	Min.	Max.
Fenceline										
AMS-2	2	2.8	5.3	4.0	26	0.0	22	4.5	0.0	22
AMS-3	3	9.0	20	13	26	0.0	21	8.9	0.0	23
AMS-4	3	4.0	10	7.0	26	0.0	11	4.0	0.0	22
AMS-5	3	5.2	9.0	6.6	26	0.0	9.2	3.6	0.0	25
AMS-6	3	5.6	12	8.8	26	0.0	17	5.4	0.0	22
AMS-7	3	3.3	13	7.1	26	0.0	11	3.5	0.0	16
AMS-8A	3	5.9	15	11	26	0.0	18	5.9	0.0	33
AMS-9C[b]	3	7.1	25	15	26	3.6	36	13	0.0	36
AMS-22	3	4.6	13	7.6	26	0.0	11	5.6	0.0	35
AMS-23	2	5.4	6.4	5.9	26	0.0	24	4.5	0.0	75
AMS-24	3	5.5	11	8.9	26	0.0	16	5.2	0.0	16
AMS-25	2	4.2	6.6	5.4	26	0.0	14	4.0	0.0	14
AMS-26	2	7.4	13	10	26	0.0	10	4.1	0.0	14
AMS-27	2	4.6	13	8.6	26	0.0	17	6.0	0.0	22
AMS-28[c]	3	2.9	14	8.2	26	0.0	13	4.3	0.0	33
AMS-29	3	5.1	11	8.4	26	0.0	31	4.6	0.0	31
Background										
AMS-12	3	2.5	4.5	3.7	26	0.0	10	2.7	0.0	34
Project Specific										
WPTH-2[d]	3	3.4	14	10	26	0.0	17	6.5	0.0	22

[a]For blank corrected concentrations less than or equal to 0.0 pCi/m^3, the concentration is set as 0.0 pCi/m^3.
[b]Summary results for 1990 through 2002 include AMS-9B/C data.
[c]AMS-28 includes WPTH-1 results.
[d]Monitor associated with the WPP.

TABLE 5-6

2003 MID-YEAR NESHAP COMPLIANCE REPORT

Location	40 CFR 61 (NESHAP) Subpart H Appendix E, Table 2; Net Ratios[a]													
	U-238	U-234	U-235/ U-236	Th-228	Th-230	Th-232	Ra-226	Th-234[b]	Ra-228[b]	Ac-228[b]	Ra-224[b]	Th-231[b]	Ratio Totals	Dose[c] (mrem)
Fenceline														
AMS-2	6.6E-003	4.1E-003	7.2E-004	1.7E-004	6.1E-003	2.5E-003	2.8E-003	2.5E-005	2.7E-004	4.2E-007	1.0E-005	1.8E-008	0.023	0.232
AMS-3	6.2E-003	4.7E-003	7.3E-004	1.6E-003	8.5E-003	4.9E-003	4.4E-003	2.3E-005	5.1E-004	8.2E-007	2.0E-005	1.9E-008	0.032	0.316
AMS-4	1.3E-003	7.2E-004	3.8E-004	2.1E-004	2.1E-003	2.0E-003	4.4E-003	4.8E-006	2.1E-004	3.3E-007	8.2E-006	9.6E-009	0.011	0.113
AMS-5	2.4E-003	1.4E-003	1.8E-004	8.2E-004	3.8E-003	--	5.6E-003	9.1E-006	--	--	--	4.6E-009	0.014	0.142
AMS-6	9.4E-003	5.3E-003	6.3E-004	1.2E-003	1.3E-002	3.4E-003	3.2E-003	3.5E-005	3.6E-004	5.7E-007	1.4E-005	1.6E-008	0.037	0.368
AMS-7	3.5E-003	2.2E-003	5.4E-004	3.2E-004	3.9E-003	2.9E-003	3.6E-003	1.3E-005	3.1E-004	4.9E-007	1.2E-005	1.4E-008	0.017	0.174
AMS-8A	6.6E-003	4.7E-003	7.2E-004	1.4E-003	8.0E-003	5.3E-003	3.2E-003	2.5E-005	5.5E-004	8.8E-007	2.2E-005	1.8E-008	0.030	0.305
AMS-9C	9.2E-003	6.8E-003	5.8E-004	1.9E-003	9.4E-003	7.5E-003	5.3E-003	3.5E-005	7.9E-004	1.3E-006	3.1E-005	1.5E-008	0.042	0.415
AMS-22	1.6E-002	7.3E-003	7.5E-004	1.2E-003	1.0E-002	3.2E-003	7.1E-003	6.0E-005	3.4E-004	5.4E-007	1.3E-005	1.9E-008	0.046	0.464
AMS-23	8.7E-003	4.4E-003	5.4E-004	2.5E-005	7.4E-003	2.8E-003	3.9E-003	3.3E-005	2.9E-004	4.6E-007	1.1E-005	1.4E-008	0.028	0.281
AMS-24	2.6E-003	1.4E-003	9.1E-005	7.1E-004	3.0E-003	4.0E-003	7.1E-003	9.8E-006	4.2E-004	6.7E-007	1.7E-005	2.3E-009	0.019	0.194
AMS-25	8.3E-004	5.5E-004	2.6E-005	--	1.0E-003	2.4E-003	6.4E-003	3.1E-006	2.5E-004	4.0E-007	1.0E-005	6.7E-010	0.012	0.115
AMS-26	8.2E-003	4.7E-003	8.8E-004	1.8E-003	8.3E-003	3.5E-003	2.8E-003	3.1E-005	3.7E-004	5.9E-007	1.4E-005	2.2E-008	0.031	0.306
AMS-27	8.9E-003	4.4E-003	1.2E-003	1.2E-003	6.7E-003	3.5E-003	3.8E-003	3.3E-005	3.7E-004	5.9E-007	1.4E-005	3.0E-008	0.030	0.301
AMS-28	1.4E-002	6.6E-003	1.0E-003	5.1E-004	7.2E-003	5.3E-003	5.9E-003	5.1E-005	5.6E-004	8.9E-007	2.2E-005	2.6E-008	0.041	0.408
AMS-29	7.6E-003	3.6E-003	5.3E-004	9.2E-004	6.6E-003	4.4E-003	--	2.9E-005	4.6E-004	7.3E-007	1.8E-005	1.4E-008	0.024	0.242
Background														
AMS-12	4.0E-004	5.8E-004	1.9E-004	6.7E-004	2.4E-003	3.0E-003	1.1E-003	1.5E-006	3.1E-004	5.0E-007	1.2E-005	4.9E-009	NA[d]	NA[d]
QA/QC														
Column Check[e]	1.115	0.630	0.095	0.139	1.058	0.575	0.696	0.004	0.060	0.000	0.002	0.000	NA[d]	4.38

Maximum Year-To-Date Ratio: 0.0464
Maximum Year-To-Date Dose (mrem): 0.46

[a]A "--" indicates the filter results were less than or equal to the blank results, and/or the indicator concentrations were less than or equal to the average net background concentrations.
[b]Isotopes assumed to be in equilibrium with their parents.
[c]Dose conversions are based on the NESHAP standard of 10 mrem per year.
[d]NA = not applicable
[e]Column check is the sum of doses from each radionuclide, followed by the sum of doses (4.38) at all fenceline monitors.

TABLE 5-7

CONTINUOUS ENVIRONMENTAL RADON MONITORING MONTHLY AVERAGE CONCENTRATIONS[a]

Location	Mid-Year 2003 Results (January - June) (Instrument Background Corrected)[b] (pCi/L)			2002 Summary Results (Instrument Background Corrected)[b] (pCi/L)		
	Min.	Max.	Avg.	Min.	Max.	Avg.
Fenceline						
AMS-02	0.1	0.5	0.3	0.0	0.6	0.3
AMS-03	0.1	0.4	0.3	0.2	0.5	0.3
AMS-04	0.2	0.3	0.3	0.1	0.2	0.1
AMS-05	0.2	0.5	0.3	0.1	0.3	0.2
AMS-06	0.3	0.5	0.4	0.1	0.4	0.2
AMS-07	0.3	0.5	0.4	0.2	0.4	0.3
AMS-08A	0.2	0.4	0.3	0.1	0.3	0.2
AMS-09C	0.2	0.4	0.3	0.0	0.7	0.2
AMS-22	0.1	0.2	0.1	0.1	0.3	0.1
AMS-23	0.2	0.3	0.2	0.0	0.2	0.1
AMS-24	0.3	0.5	0.4	0.1	0.3	0.2
AMS-25	0.2	0.3	0.3	0.1	0.3	0.2
AMS-26	0.2	0.3	0.3	0.1	0.3	0.2
AMS-27	0.2	0.5	0.3	0.1	0.3	0.2
AMS-28	0.3	0.5	0.4	0.1	0.4	0.2
AMS-29	0.2	0.4	0.3	0.1	0.5	0.3
Background						
AMS-12	0.2	0.3	0.2	0.1	0.2	0.1
On Site						
KNE	0.4	2.9	1.5	3.0	5.6	4.5
KNO	0.6	3.1	1.4	0.2	3.1	1.5
KNW/KNW-A	0.4	1.4	0.9	0.5	1.5	1.0
KSE	0.3	4.0	1.5	1.4	3.1	2.4
KSO	0.4	0.8	0.7	0.2	1.2	0.6
KSW/KSW-A	0.4	1.5	0.9	0.7	1.7	1.0
KTOP	0.4	12	6.1	3.2	8.8	5.7
LP2	0.4	0.8	0.6	0.1	0.8	0.4
Pilot Plant Warehouse	0.3	0.8	0.4	0.1	0.5	0.3
PR-1	0.3	0.5	0.4	0.1	0.5	0.3
Rally Point 4	0.3	0.7	0.5	0.2	0.6	0.3
Surge Lagoon	0.2	0.8	0.5	0.4	1.3	0.8
T117	0.2	0.5	0.4	0.2	1.0	0.4
T28/T28A	0.2	0.7	0.5	0.4	0.7	0.6
TS4	0.1	0.2	0.2	0.4	0.6	0.5
WP-17A	0.1	0.5	0.3	0.1	0.7	0.4

[a]Monthly average radon concentrations are calculated from daily average concentrations. Daily average concentrations are calculated by summing all hourly count data, treating the sum as a single daily measurement, and then converting the sum to a (daily average) concentration.
[b]Instrument background changes as monitors are replaced.

TABLE 5-8

DIRECT RADIATION TLD MEASUREMENTS

	Direct Radiation (mrem)		
	Mid-Year 2003 Summary Results		
Location	First Qtr	Second Qtr	2002 Summary Results
Fenceline			
2	18	17	83
3	17	16	82
4	17	16	78
5	18	16	80
6	20	17	97
7	17	16	80
8A	19	17	84
9C	19	17	87
13	17	15	85
14	19	17	84
15	20	17	91
16	21	18	97
17	17	17	82
34	17	17	82
35	16	16	76
36	19	15	71
37	16	18	87
38	19	14	72
39	17	18	87
40	18	15	76
41	19	15	83
On Site (K-65 area)			
22	220	99	1196
23A	254	104	1220
24	191	56	934
25	-	79	1058
26	211	52	689
43	231	71	316
44	77	71	322
45	69	31	117
46	36	31	122
47	-	20	59
32 (Bldg. 53A Dosimetry Lab)	17	12	56
Background			
19	16	15	73
20	15	15	70
27	13	14	71
33	18	16	76
42	16	17	83

TABLE 5-9

NESHAP STACK EMISSION MONITORING RESULTS

	Mid-Year Results		2002 Year End Results	
Analysis Performed	No. of Samples	Total Pounds[a,c]	No. of Samples	Total Pounds[a,b,c]
Building 71 Stack[b]				
Uranium, Total	3	8.8E-06	5	2.7E-05
Uranium-238	3	2.8E-05	3	1.5E-05
Uranium-235/236	3	6.3E-07	3	ND
Uranium-234	3	1.6E-09	3	1.0E-09
Thorium-232	3	2.2E-05	5	3.1E-05
Thorium-230	3	3.6E-10	5	4.3E-10
Thorium-228	3	9.1E-16	5	4.2E-15
Total Particulate	3	0.0E+00	5	1.1E-01
Silos RCS Stack				
Uranium-238	2	1.6E-05	1	ND
Uranium-235/236	2	ND	1	ND
Uranium-234	2	7.3E-10	1	ND
Thorium-232	2	2.4E-05	1	ND
Thorium-230	2	5.9E-10	1	1.5E-09
Thorium-228	2	1.9E-15	1	ND
Thorium-227	2	ND	1	ND
Radium-226	2	ND	1	ND
Polonium-210	2	1.7E-15	1	2.9E-15
Total Particulate	2	0.0E+00	1	0.0E+00
WPP Dryer Stack				
Uranium-238	6	8.1E-06	14	1.6E-05
Uranium-235/236	6	5.1E-08	14	2.5E-08
Uranium-234	6	3.3E-10	14	5.8E-10
Thorium-232	6	ND	14	1.0E-06
Thorium-230	6	2.0E-10	14	2.4E-10
Thorium-228	6	4.9E-16	14	3.2E-16
Radium-226	6	4.6E-13	14	4.4E-13
WPP Pugmill Stack				
Uranium-238	28	5.2E-04	37	9.1E-04
Uranium-235/236	28	2.3E-06	37	3.3E-06
Uranium-234	28	1.9E-08	37	2.5E-08
Thorium-232	28	1.6E-04	37	2.1E-04
Thorium-230	28	2.4E-08	37	5.8E-08
Thorium-228	28	3.1E-14	37	3.5E-14
Radium-226	28	8.2E-12	37	6.1E-11

	2003 Mid-Year Results		
Analysis Performed	Maximum Release	Total Release (µCi)	Estimated Max. Hourly Release Rate, Rn-222 (µCi/hr)
WPP Dryer Stack			
Radon-220/222	5192 (µCi/hr)	3,339,000	13,000
Silos RCS Stack			
Radon-220/222	203 (µCi/instant.)	2,141,000	13,000

[a]Total pounds are only determined from detected results.

[b]Includes sample probe rinse.

[c]ND = not detectable

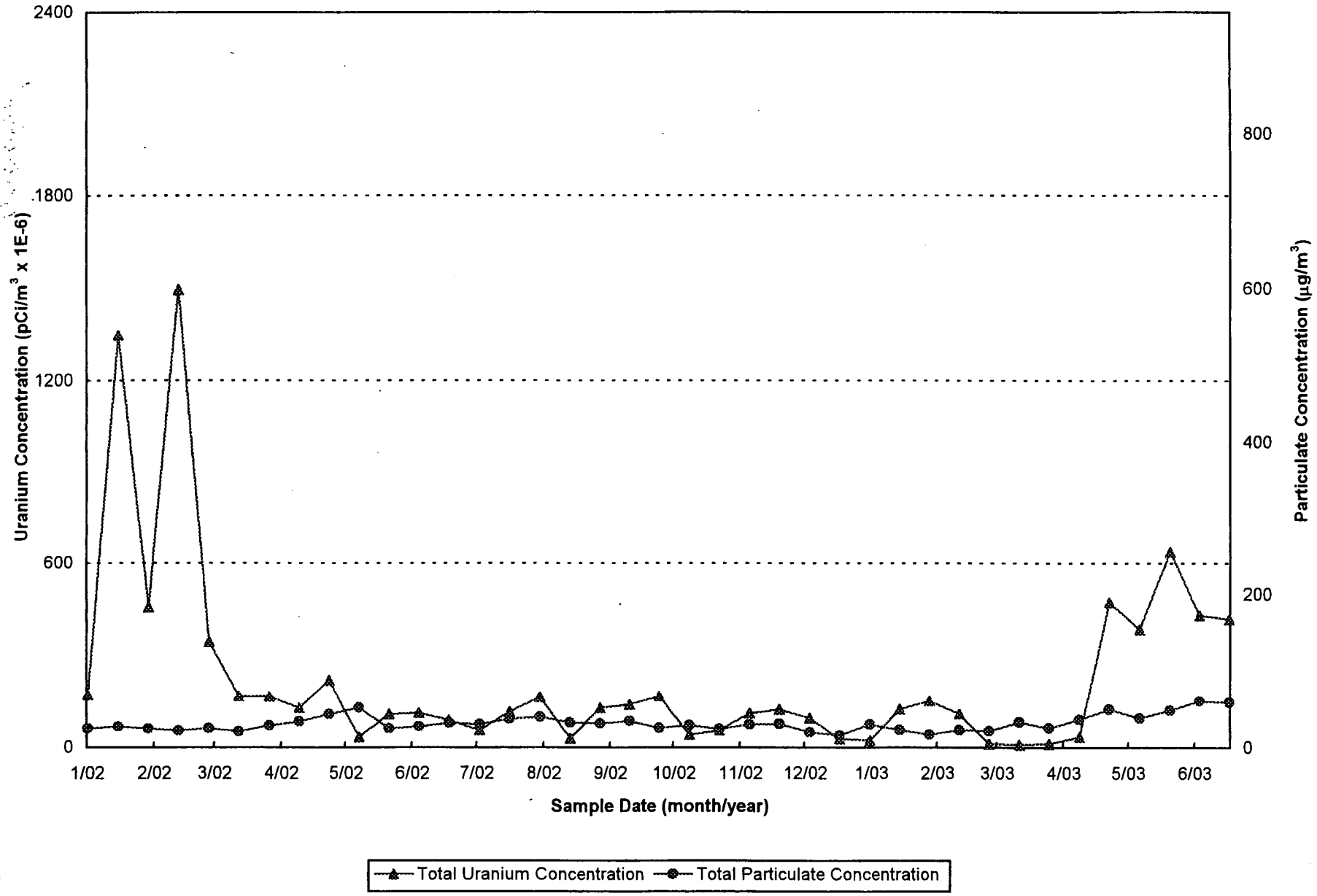


FIGURE 5-1. JANUARY 2002 THROUGH JUNE 2003 TOTAL URANIUM AND PARTICULATE CONCENTRATIONS IN AIR FROM BIWEEKLY SAMPLES AT AMS-3

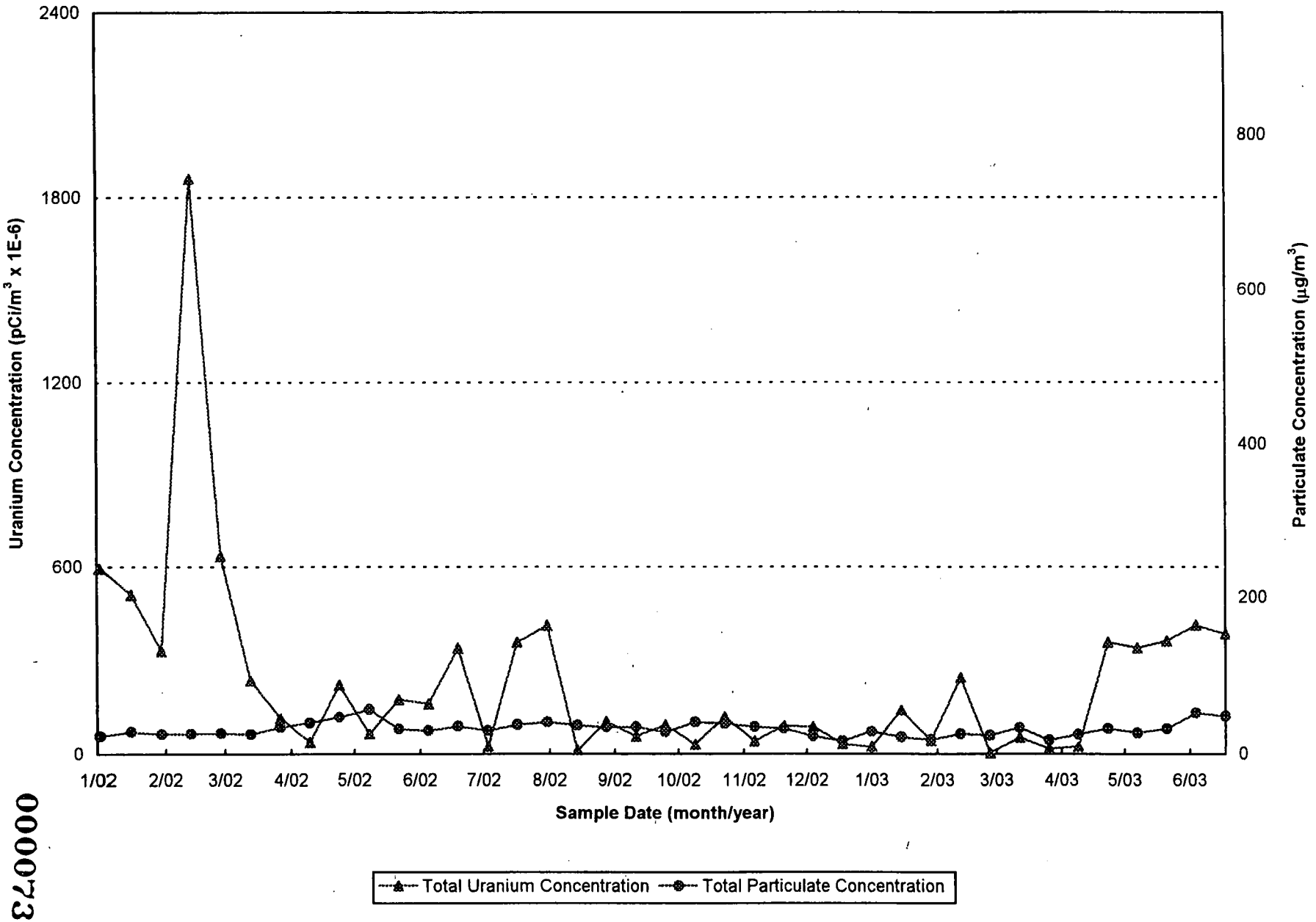


FIGURE 5-2. JANUARY 2002 THROUGH JUNE 2003 TOTAL URANIUM AND PARTICULATE CONCENTRATIONS IN AIR FROM BIWEEKLY SAMPLES AT AMS-8A

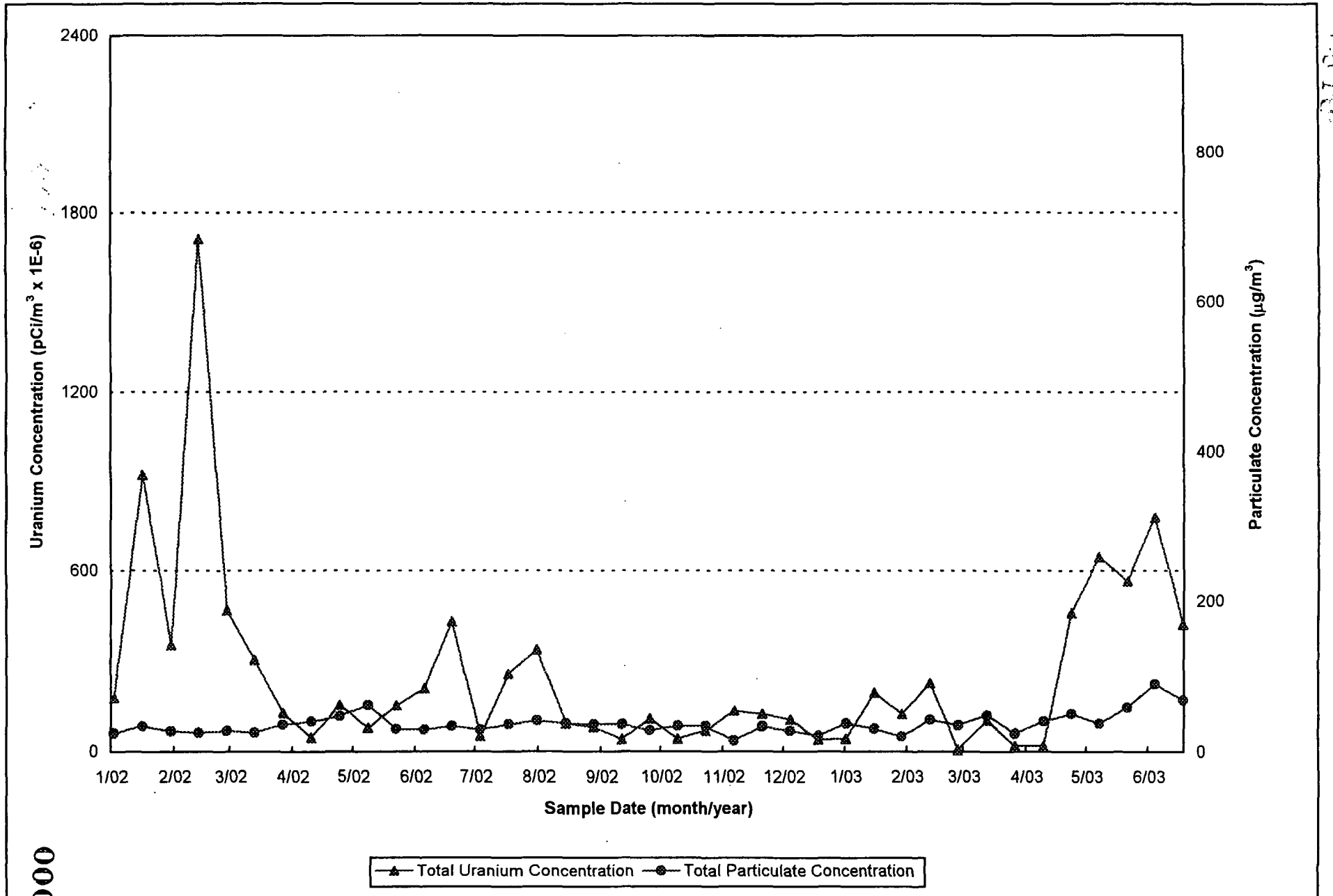


FIGURE 5-3. JANUARY 2002 THROUGH JUNE 2003 TOTAL URANIUM AND PARTICULATE CONCENTRATIONS IN AIR FROM BIWEEKLY SAMPLES AT AMS-9C

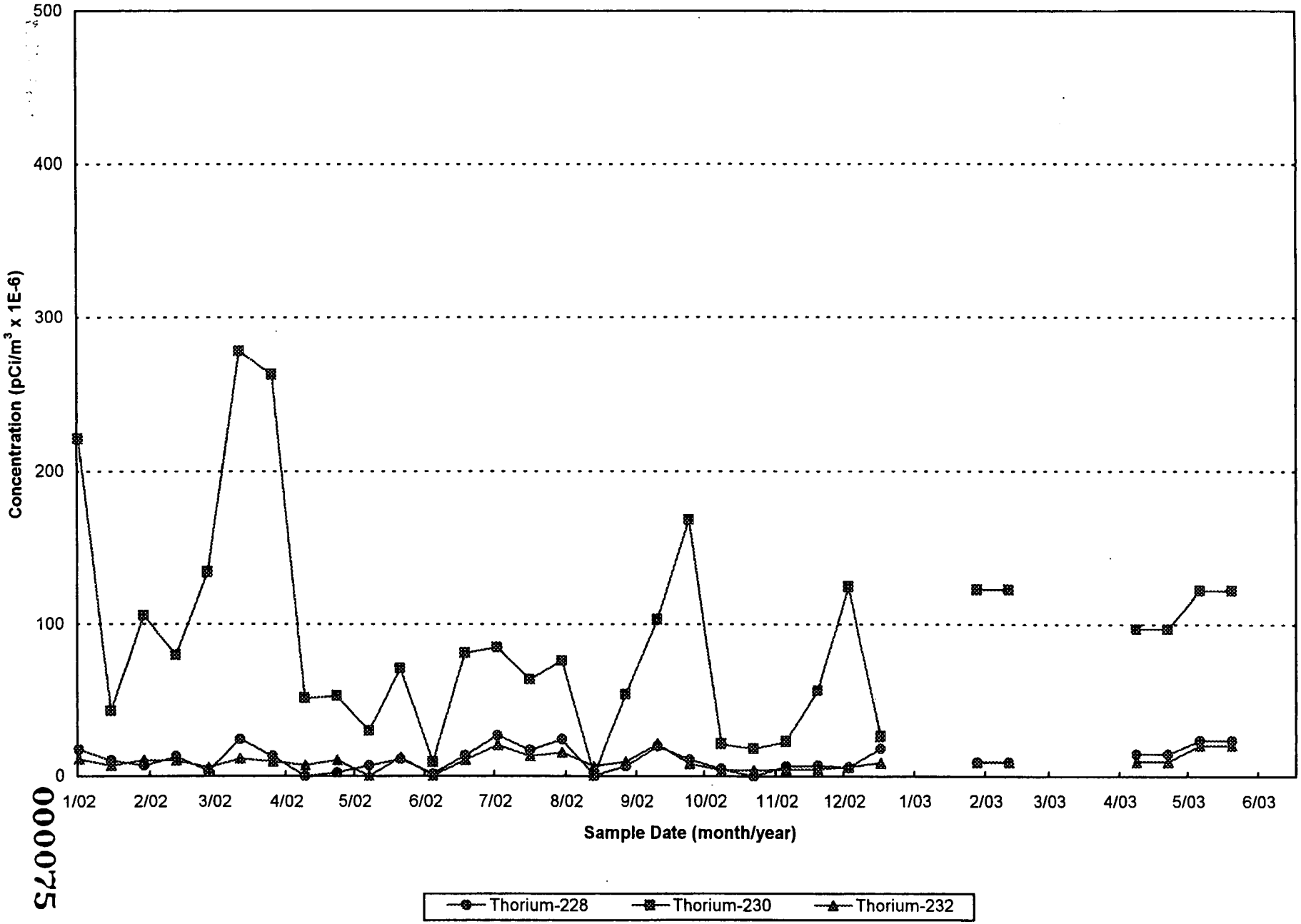


FIGURE 5-4. JANUARY 2002 THROUGH JUNE 2003 THORIUM-228, THORIUM-230, AND THORIUM-232 CONCENTRATIONS IN AIR AT AMS-3

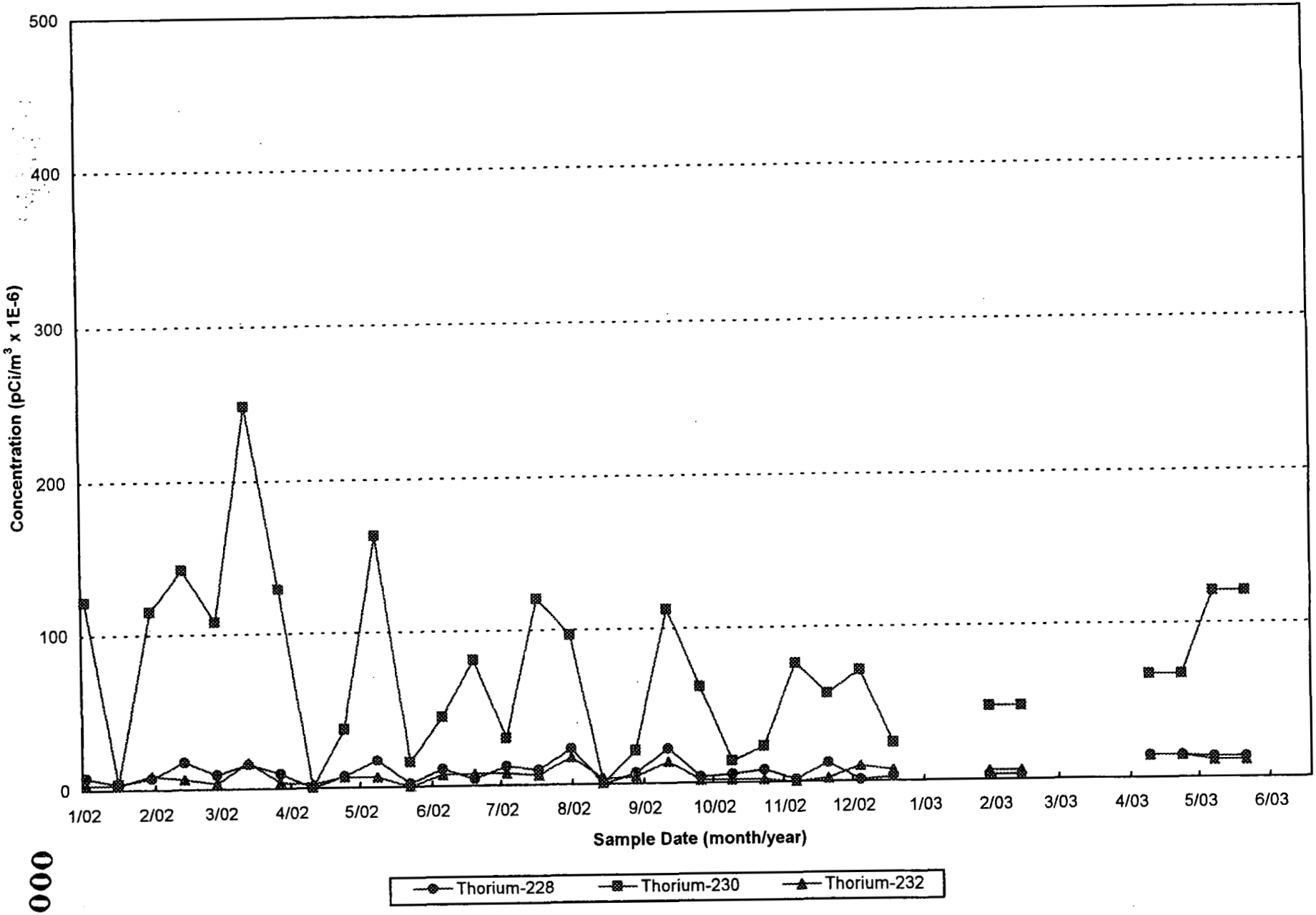


FIGURE 5-5. JANUARY 2002 THROUGH JUNE 2003 THORIUM-228, THORIUM-230, AND THORIUM-232 CONCENTRATIONS IN AIR AT AMS-8A

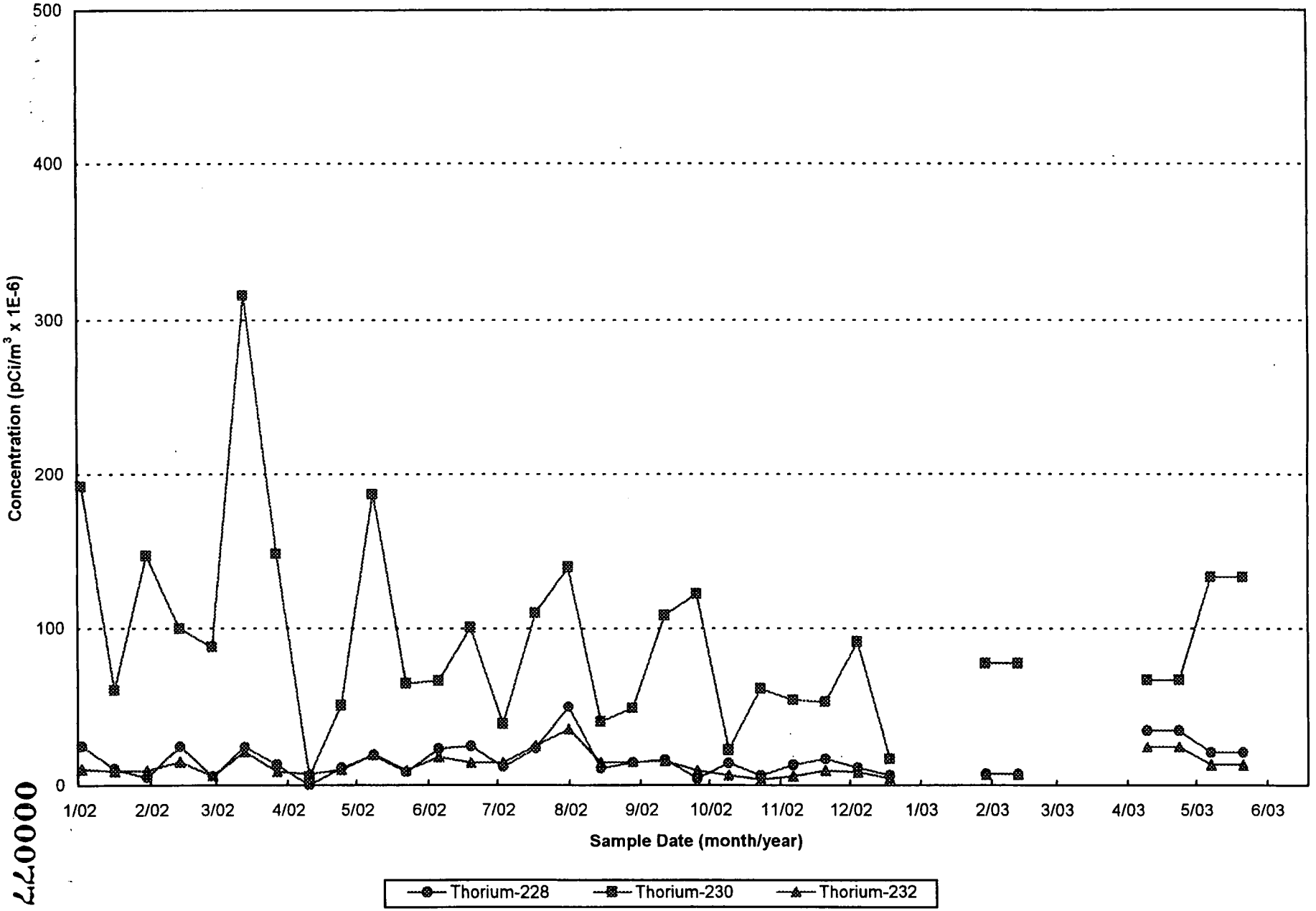


FIGURE 5-6. JANUARY 2002 THROUGH JUNE 2003 THORIUM-228, THORIUM-230, AND THORIUM-232 CONCENTRATIONS IN AIR AT AMS-9C

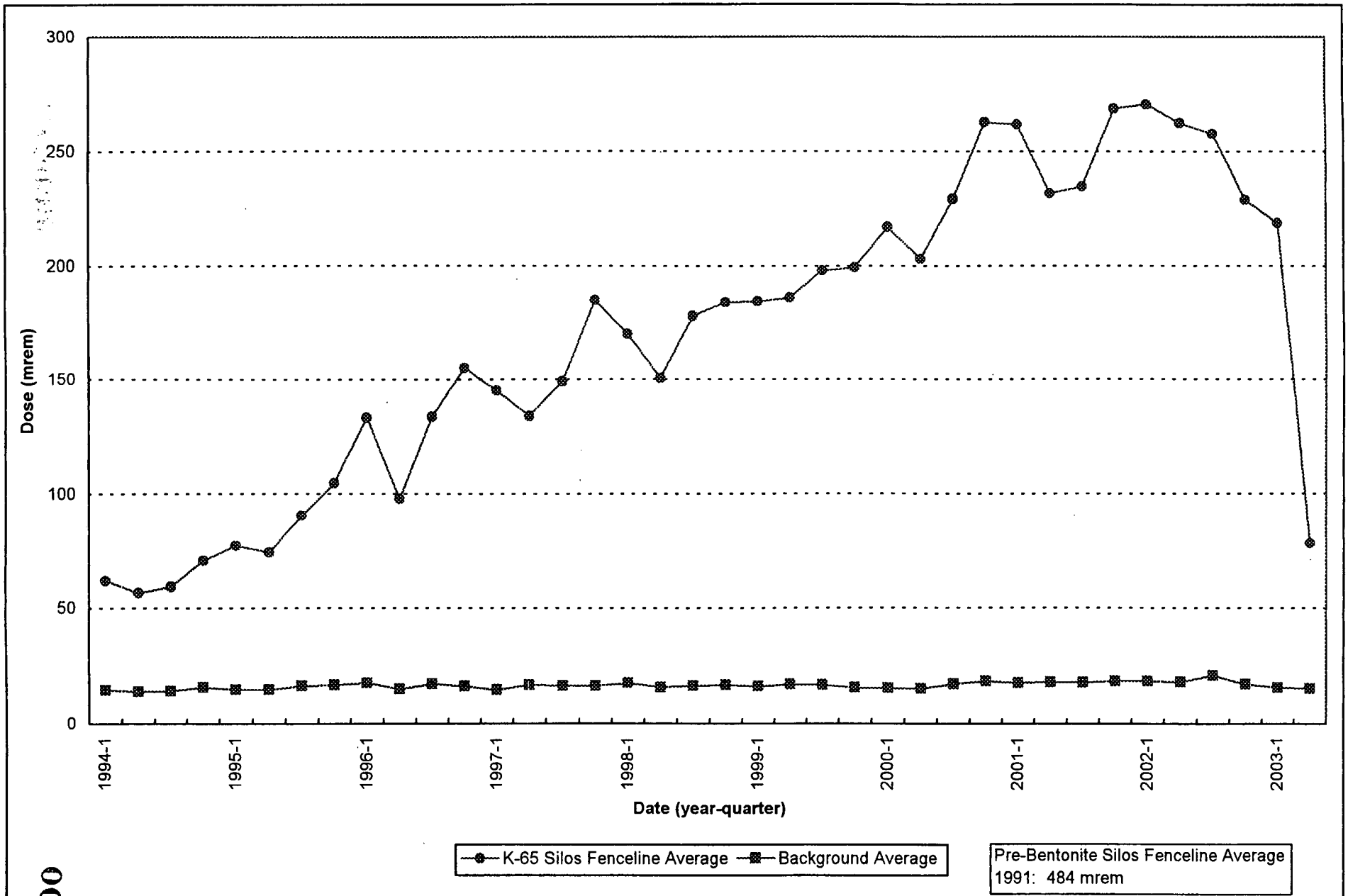


FIGURE 5-7. QUARTERLY DIRECT RADIATION (TLD) MEASUREMENTS, 1994 - 2003
(K-65 SILOS FENCELINE AVERAGE VS. BACKGROUND AVERAGE)

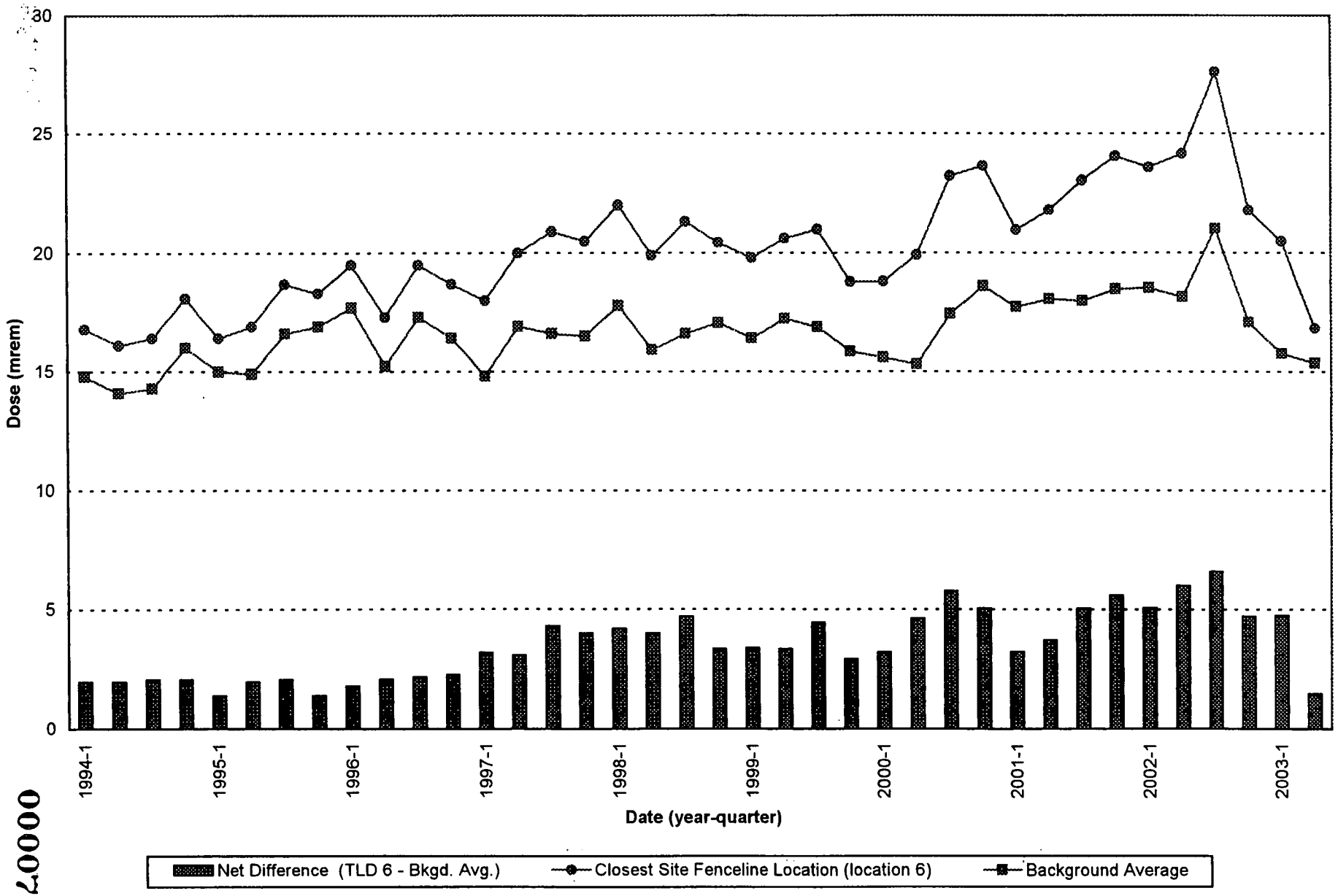
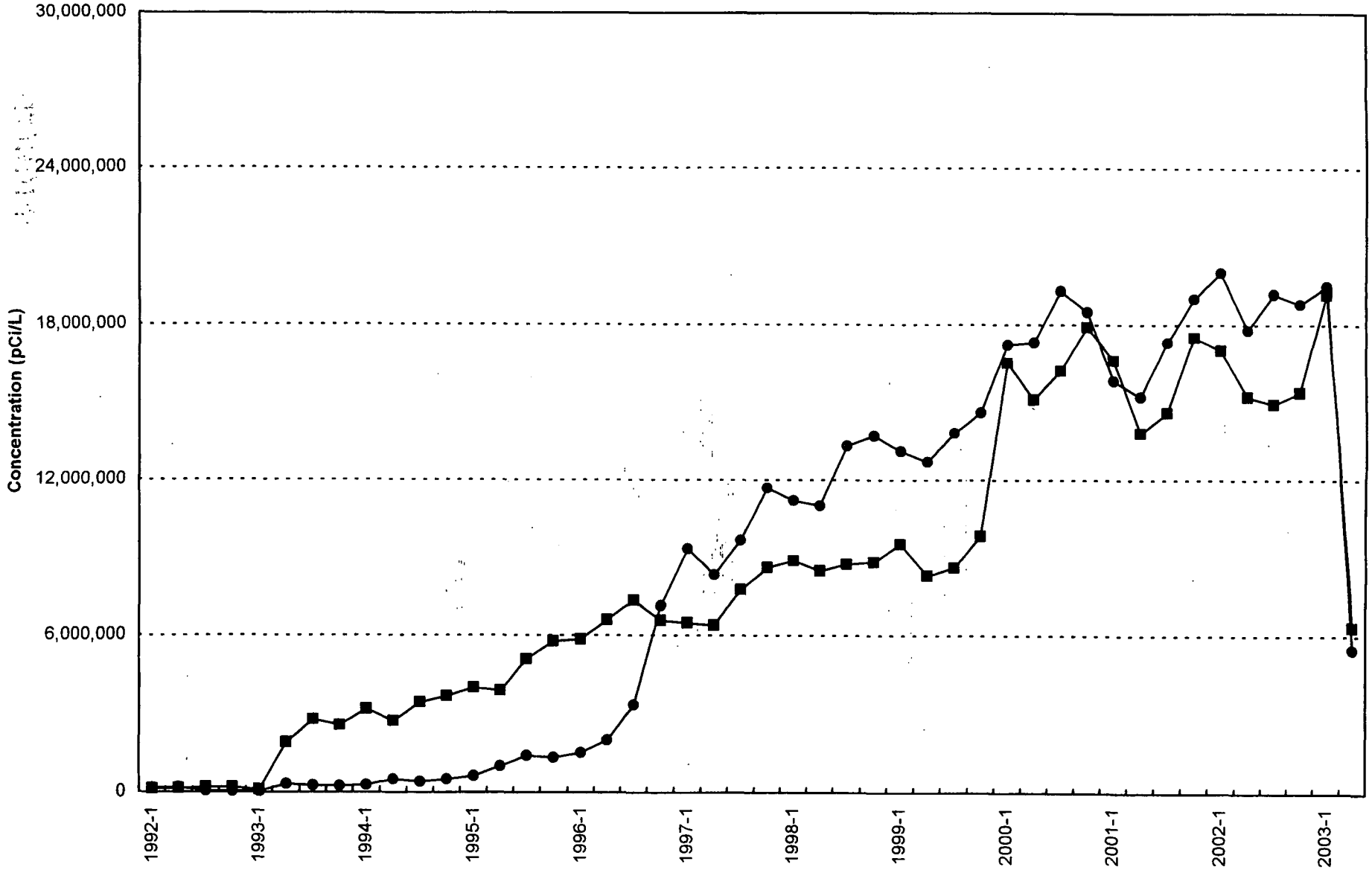


FIGURE 5-8. QUARTERLY DIRECT RADIATION (TLD) MEASUREMENTS, 1994 - 2003
(LOCATION 6 VS. BACKGROUND AVERAGE)



Note: 1) Defective sample line for Silo 1 was replaced during fourth quarter 1996.
2) Silo headspace correction was applied beginning with the first quarter of 2000.

FIGURE 5-9. QUARTERLY K-65 SILO HEADSPACE RADON CONCENTRATIONS, 1992 - SECOND QUARTER 2002

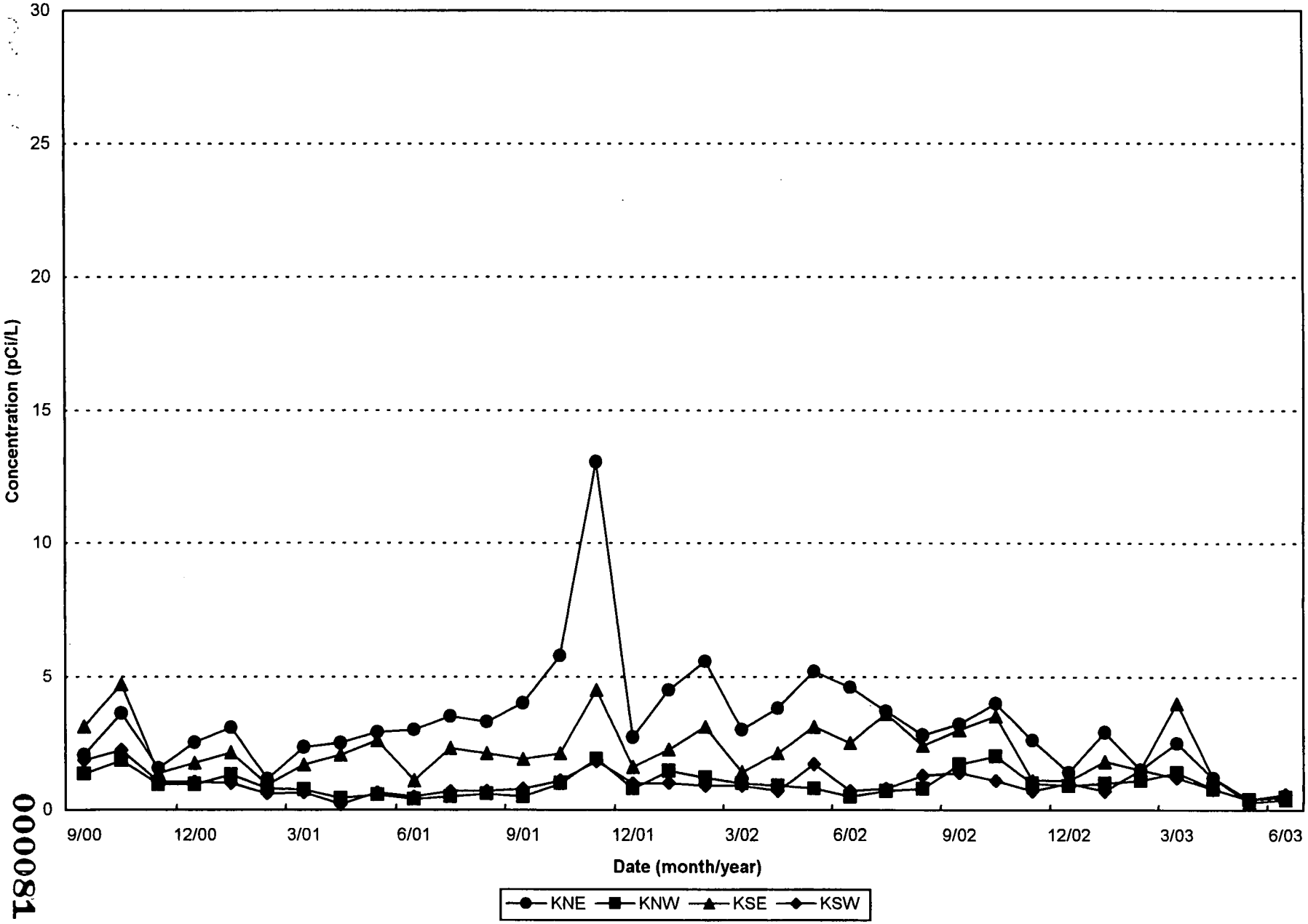


FIGURE 5-10. MONTHLY AVERAGE RADON CONCENTRATIONS FOR SILO EXCLUSION FENCE MONITORS, SEPTEMBER 2000 - JUNE 2003

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